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DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE PROPOSED CENTRAL MONTANA 100-KV TRANSMISSION PROJECT

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CHAPTER ONE: INTRODUCTION

This environmental impact statement (EIS) addresses the proposed Judith Gap to Glengarry 100-kilovolt (kV) transmission line in Wheatland, Judith Basin, and Fergus counties. The project would be owned and operated by the Montana Power Company (MPC). The proposed project involves construction of a 100-kV transmission line extending northeast 32 miles from a new substation to be built about 2 miles west of Judith Gap to the Glengarry Substation 5 miles west of Lewistown, Montana. The new substation would tap the Broadview to Great Falls 230-kV line. Figure 1 shows the general location of substations and routes.

This chapter describes the environmental impact statement process followed by state agencies under the Montana Major Facility Siting Act (MFSA). Chapter Two describes the MPC proposal to construct and operate the 100-kV transmission line in the central Montana area. Chapter Three presents the Department of Natural Resources and Conservation (DNRC) economic evaluation of the need for the facility and alternatives to it. Chapter Four contains an assessment of social, economic and environmental impacts likely to result from construction and operation of the project, along with measures to reduce impacts from the project. Chapter Five provides a comparison of several feasible routes for the transmission line. Chapter Six presents preliminary recommendations by DNRC to the Board of Natural Resources and Conservation, which must approve the project before it can be built.

STATE ACTION ON THE PROPOSED PROJECT

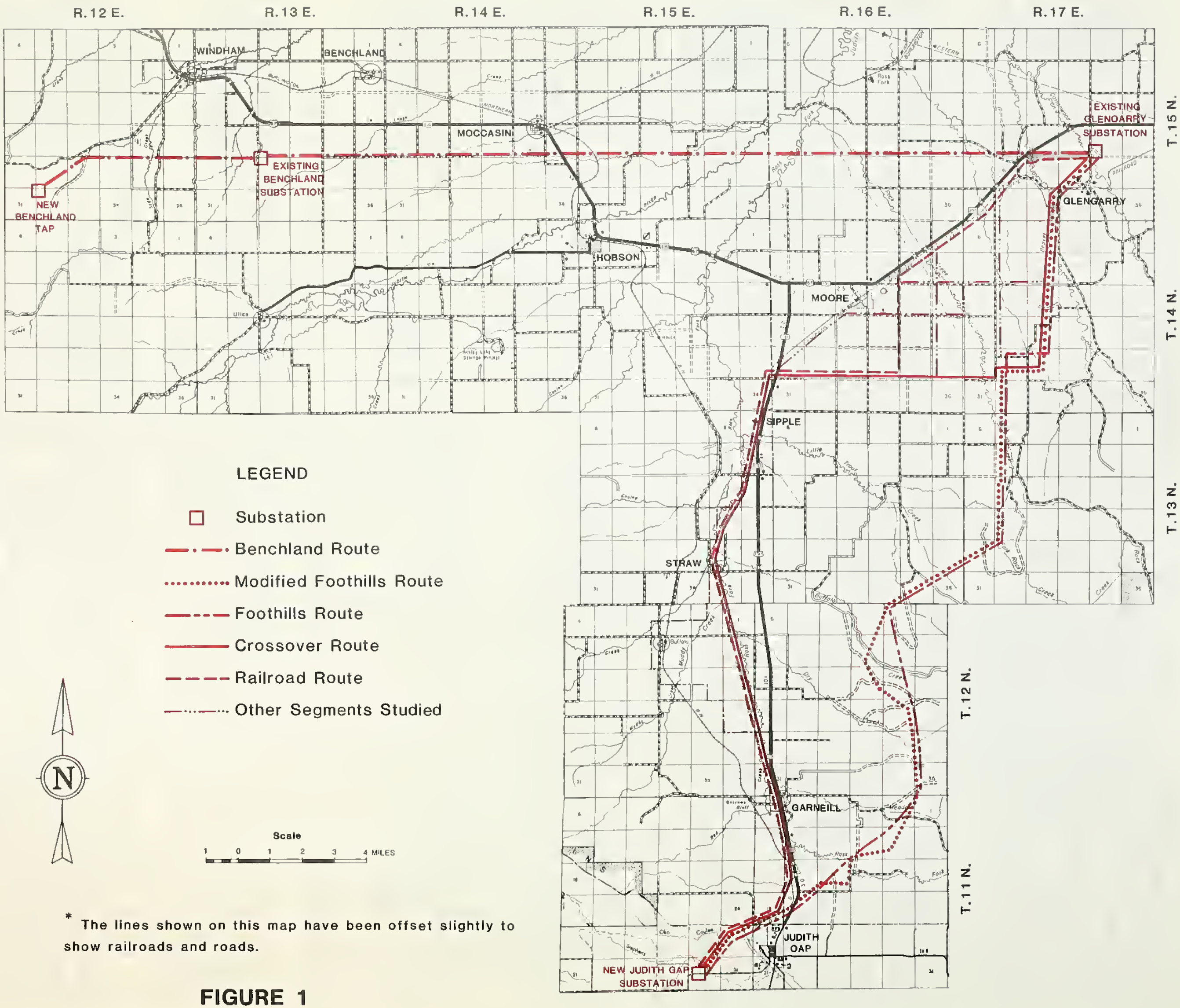
In June, 1983, MPC filed an application under MFSA with DNRC and the Department of Health and Environmental Sciences (DHES). Both departments accepted the application as complete in September 1983, which triggered the requirement for review of the project through an environmental impact statement.

MFSA requires comprehensive review of proposals to construct and operate certain kinds of facilities for transmitting, generating, or converting energy in Montana. Transmission facilities operating at voltages greater than 69-kV, such as the Judith Gap to Glengarry project, fall under the Act. MFSA requires that the Board of Natural Resources and Conservation must certify public need for and environmental compatibility of proposed facilities before construction can be approved.

Requirements of the Board and Department of Health and Environmental Sciences

Within one year after it accepts an application, DHES is required to issue a decision as to whether the proposed project would comply with all applicable laws it administers. The feasibility of complying with all permit requirements and standards under DHES's jurisdiction must be determined for the primary and reasonable alternate locations for the proposed facility.

DHES reviewed the proposed project and its alternatives for compliance with air and water quality and trash and garbage disposal requirements. The DHES review determined that the proposed MPC transmission line would comply with all laws and regulations administered by DHES. No air quality permits need be obtained for construction of this project. The project, as proposed, does not require either discharge permits or short-term authorization to exceed state water quality standards. Garbage and trash generated by construction and operation of the project



* The lines shown on this map have been offset slightly to show railroads and roads.

FIGURE 1
LINE LOCATION OPTIONS*

must be disposed of in licensed Class II landfills while any hazardous waste generated must be properly disposed of in accordance with DHES regulations (ARM 16.44.101 et. seq.). Appendix A provides correspondence from DHES regarding the review of the application and evaluation of the project for necessary permits.

Requirements of the Board of Natural Resources and Conservation

MFSA requires the Board to determine whether a proposed project is needed and is properly designed and located to cause no more than minimum adverse impacts, considering the state of available technology and the nature and economics of the alternatives. DNRC evaluates potential locations and compiles an environmental assessment and evaluation of the proposal for the Board. After submission of the report, the Board appoints a hearings examiner and begins its hearing process, which provides a record that the Board will use in making a decision. Before the Board can approve the proposed facility, it must determine (1) the basis of need for the facility, (2) the nature of the probable environmental impact, (3) that the facility represents the minimum adverse environmental impact considering the state of available technology and the nature and economics of the various alternatives, (4) that the facility is consistent with regional plans for expansion of the interconnected grid, (5) that the facility will serve the interests of the utility system economy and reliability, (6) that the facility will serve the public interest, convenience, and necessity, and (7) that DHES has issued any permits required within its jurisdiction.

DNRC Approach to EIS Preparation

The Montana Environmental Policy Act (MEPA)(75-1-101 et seq. MCA) requires preparation of an EIS on any major state action that may significantly affect the quality of the human environment. The Board's decision whether to grant the MFSA certificate constitutes such action, and the environmental impact statement process must be completed before the Board can approve or reject the proposal.

Comments by interested persons are encouraged at a number of points in the process. The major steps followed by the Department and Board in the approval process for a project are described below.

The process starts when DNRC accepts an application for a Certificate of Environmental Compatibility and Public Need filed by a project sponsor, in this case, MPC. DNRC then holds public meetings to identify issues and concerns and to gather information from members of the public and affected landowners about the project. DNRC gathers additional information through field work and studies.

All information collected through meetings and field work along with information supplied in the application is evaluated and compiled into an EIS . The initial version of this document, called the "draft" EIS, contains a description of the project, impacts that can be expected from the project, measures that would reduce or minimize the impacts, initial comparisons of alternatives and DNRC's preliminary recommendations to the Board. After the draft impact statement is issued to the public, DNRC holds a public meeting to receive formal oral or written comment on the information it contains.

DNRC evaluates the comments on the draft EIS to determine what issues remain to be dealt with. The final impact statement contains responses to these comments, information or issues raised since publication of the draft, and DNRC's final recommendations to the Board.

The Board holds a formal hearing on the project after issuance of the final impact statement. Based on all information presented at the hearing, the Board determines whether to approve the facility. If the Board approves the project, it also selects a route for the transmission line.

DNRC has solicited information from other state agencies regarding the potential impacts of the proposed project on each department's jurisdiction. In the case of the proposed project, DNRC consulted with the Department of Highways, the Department of State Lands, the Department of Fish, Wildlife and Parks, and the State Historic Preservation Office. Other state agencies asked to comment on the EIS include: Department of Agriculture, Department of Administration, Department of Commerce, Department of Revenue, and Public Service Commission.

Public Participation

DNRC held public meetings in Moore on March 8 and July 2, 1984, to present information on the project and receive comment from landowners and interested persons. Forty-one persons attended the March meeting, and 39 attended the July meeting. Issues identified for consideration included: potential for weed problems along transmission line and access roads; possible use of the abandoned Milwaukee Road right-of-way for location of the line; and alternatives to the new transmission line, such as upgrading existing lines in the area. Information received at these meetings was used by DNRC to help define issues to be evaluated and presented in this draft EIS. Alternate locations suggested by persons at meetings and in discussions with DNRC were evaluated. The results of these investigations were used to narrow the options for locating the line.

CHAPTER TWO: APPLICANT'S PROPOSED PROJECT

INTRODUCTION

MPC proposes to construct a 32-mile 100-kV transmission line from a new substation that would be built west of Judith Gap to the Glengarry Substation (see Figure 1). The new substation would be built on a 4-acre site 2.5 miles west of Judith Gap on land now used for grazing. The proposed substation would tap power from the Broadview to Great Falls 230-kV line near Judith Gap. The existing Great Falls to Harlowton 100-kV line also would be connected to the substation to further strengthen the power supply system in the central Montana area. Some additional equipment would be required at the Glengarry Substation to allow connection of the new line there. The proposal is intended to correct existing low voltage and power reliability problems and supply future needs in the Lewistown vicinity.

An alternate proposal MPC considered was construction of 42 miles of 100-kV line along with a new substation 7 miles west of the Benchland substation (see Figure 1). The new substation would tap power from the Broadview to Great Falls 230-kV line southwest of Windham. Two 100-kV lines would be built for 7 miles between the new substation and the Benchland substation. A single 100-kV line 28 miles long would be constructed along the present 100-kV line to the Glengarry Substation. Approximately 4 acres of land now used for rangeland would be required for the new substation that is a part of this option. These and other alternatives to the project evaluated by DNRC are discussed in Chapters Three and Five.

PROPOSED PROJECT

Facilities

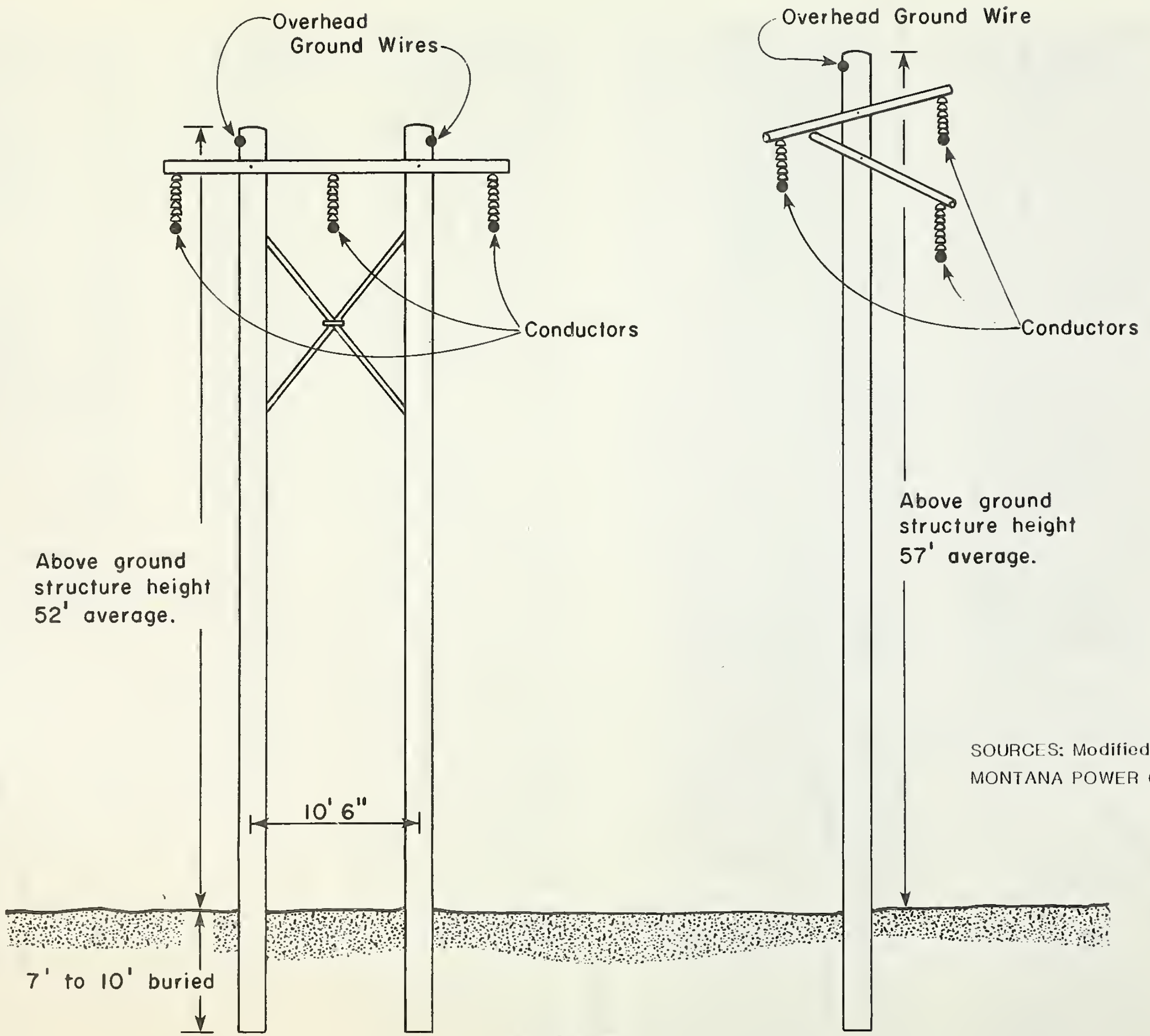
The Judith Gap to Glengarry transmission line would use wood pole structures. H-frame wood pole structures would be used across grazing land, and single wood poles would be used when crossing cultivated land or other areas where larger structures would interfere with land use (Figure 2). Most of the poles would be 60 feet long, 8 feet of which would be set in the ground. Where the terrain requires, the poles may vary in length from 50 to 80 feet. H-frame structures can be placed approximately 800 feet apart, equivalent to 6.6 spans per mile. Single poles, in sections of line that require them, would be placed 450 feet apart or 11.7 spans per mile. Guy wires would be required wherever the line turns a corner.

The transmission line will be built to comply with the National Electric Safety Code. This code requires that under normal operating conditions the conductors not be allowed to sag closer than 27.5 feet from the ground. The line will require three conductors. Overhead ground wires will be used to protect the line from lightning (see Figure 2).

Land Acquisition and Right-of-Way Use

MPC's standard right-of-way width for 100-kV H-frame structures is 60 feet. Right-of-way width for single wood poles would be 40 feet.

MPC would obtain a right-of-way easement for maintainence and operation of the transmission line. It would purchase land for the new substation. Ownership of the land within the right-of-way would remain with the landowner and any use of the land that did not interfere with rights acquired by MPC in the easement could continue.



SOURCES: Modified from
MONTANA POWER COMPANY 1983

FIGURE 2

STRUCTURES PROPOSED FOR THE CENTRAL MONTANA PROJECT

MPC normally would acquire land through easement negotiations with individual landowners. MPC has the right of eminent domain, which provides the power to condemn property for a right-of-way if normal easement negotiations are not successful.

Construction

Construction of the 100-kV transmission line would require use of both heavy and light equipment. Construction operations normally required for transmission lines of this size are shown in Figures 3 and 4. Actual equipment used may differ slightly, depending on the contractor.

The line's construction labor force would range in size from 3 to 35 workers, with an average of about 20. Construction of the line could begin after the Board's approval of location for structures and access roads. MPC plans to begin line construction in the spring of 1986 and could be finished by about October 1, 1986. Workers would include laborers, equipment operators, linemen, groundmen, and supervisors. Construction at the Judith Gap Substation could begin in June, 1985, and be finished by October 1. It would require as many as 6 - 8 persons. Work on the Glengarry Substation could begin in August, 1985, and be complete by October 1. It would require 2 - 4 persons.

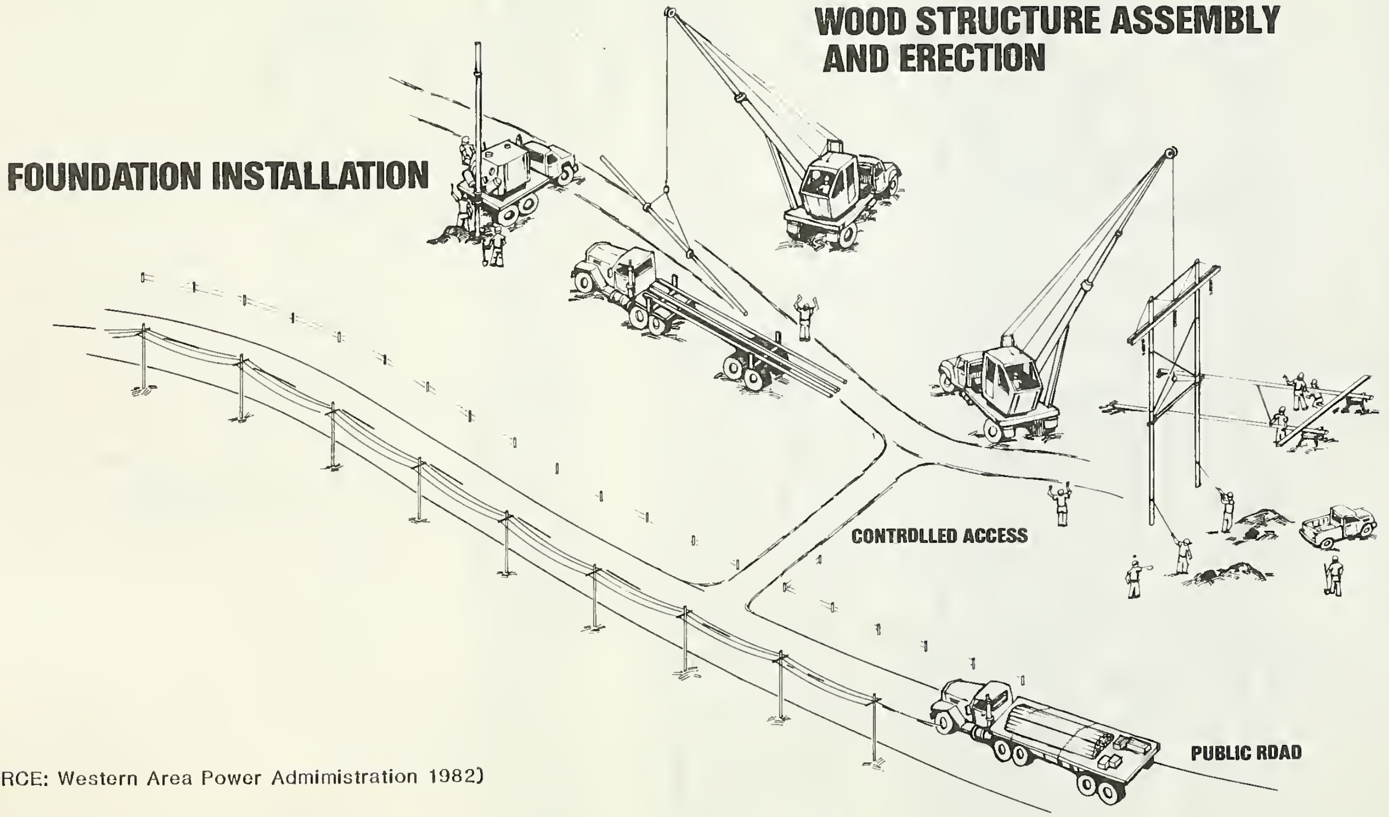
Operation

Operation of the new Judith Gap substation and the 100-kV line would be automated and would not require any permanent employees.

The transmission line would be operated at nominal voltage of 100-kV. Noise from the line is expected to be 25 decibels at the edge of a 60 foot right-of-way. Decibels are a measure of noise. Noise from this line would be barely discernible.

Maintenance

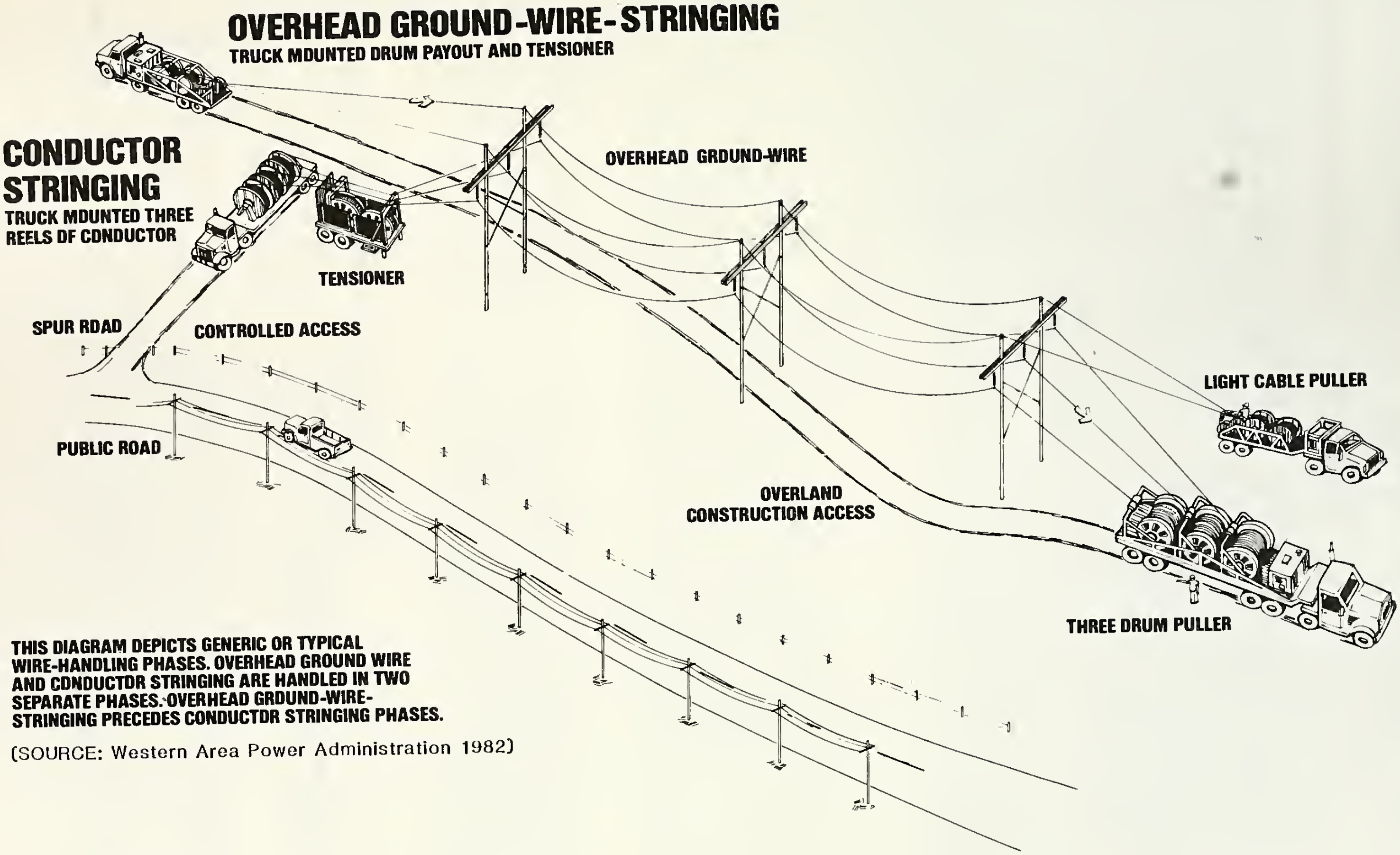
Maintenance work on the substation would involve routine checks and service to correct any problems with components. Routine checks of the transmission line would occur twice yearly, and initially would involve one vehicle driving along the right-of-way. Helicopters and fixed-wing aircraft would be used after the first year.



(SOURCE: Western Area Power Admimistration 1982)

FIGURE 3

TYPICAL CONSTRUCTION ACTIVITIES


OVERHEAD GROUND-WIRE-STRINGING
TRUCK MOUNTED DRUM PAYOUT AND TENSIONER
CONDUCTOR STRINGING
TRUCK MOUNTED THREE REELS OF CONDUCTOR
OVERHEAD GROUND-WIRE
TENSIONER
SPUR ROAD
CONTROLLED ACCESS
LIGHT CABLE PULLER
PUBLIC ROAD
OVERLAND CONSTRUCTION ACCESS
THREE DRUM PULLER

THIS DIAGRAM DEPICTS GENERIC OR TYPICAL WIRE-HANDLING PHASES. OVERHEAD GROUND WIRE AND CONDUCTOR STRINGING ARE HANDLED IN TWO SEPARATE PHASES. OVERHEAD GROUND-WIRE-STRINGING PRECEDES CONDUCTOR STRINGING PHASES.

(SOURCE: Western Area Power Administration 1982)

FIGURE 4

BASIC WIRE–HANDLING EQUIPMENT

CHAPTER THREE: ECONOMIC ANALYSIS OF THE PROPOSED PROJECT AND ITS ALTERNATIVES

DESCRIPTION OF THE EXISTING TRANSMISSION SYSTEM

The Lewistown area is served by the MPC 100-kV system at three points (see Figure 5). A single 100-kV transmission line from the Benchland Substation to the Glengarry Substation provides most of the power. The 100-kV system also feeds two 50-kV lines that carry power to the Lewistown area, serving various intermediate substations on the way. One 50-kV line connects with the 100-kV system at Stanford and feeds Glengarry via Windham and other substations. A second 50-kV line into Glengarry is fed off the 100-kV system at Harlowton. A third 50-kV line connects Roundup to Lewistown, but it is intended to serve intermediate substations and can not carry power to Lewistown from Roundup under normal conditions. The 100-kV system is connected to MPC's 230-kV system at Broadview and at Great Falls.

The main feed into the Lewistown area is the Benchland-Glengarry 100-kV line; the 50-kV system does not transport much of the power consumed in the area. The 50-kV lines are old and have high resistance to current flow. Consequently, voltage drop from one end to the other is excessive, and power flows are concentrated on the more efficient 100-kV line.

EXPLANATION AND EVALUATION OF NEED

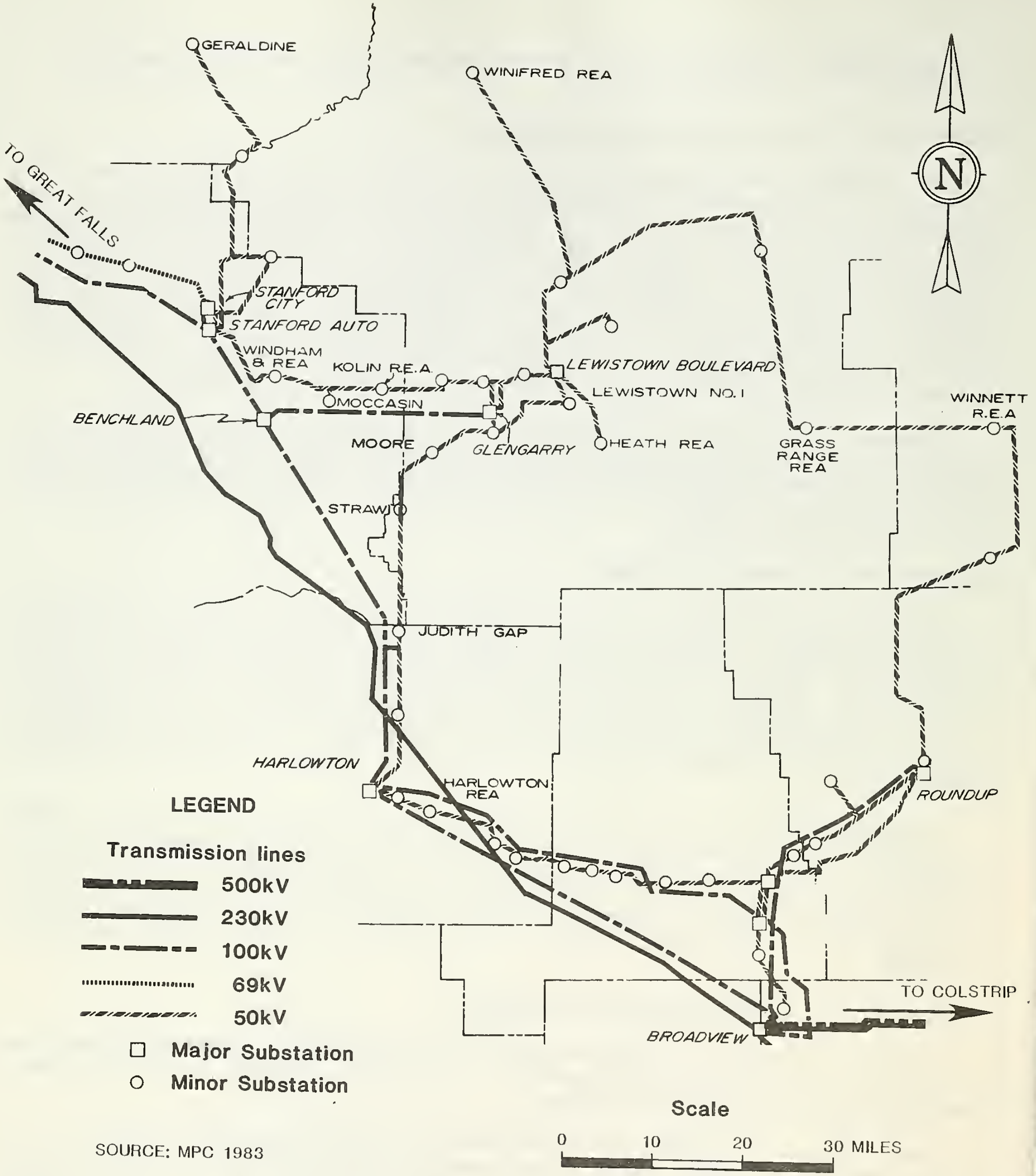
MPC has proposed the Judith Gap to Glengarry project to serve two functions. The first function is to reinforce voltages in the Lewistown area under "system normal" conditions. ("System normal" means that all transmission lines are fully operational). Analysis of the electrical transmission system in the area indicates that voltages are only marginally acceptable at some substations in the area when loads are heavy, mainly during cold winter conditions. Voltage levels above or below the acceptable range may damage electrical equipment or cause it to operate improperly.

The second function for the line is to provide reliability of service. MPC's reliability planning criterion requires that the transmission system be able to adequately serve loads even under the "worst case single outage," which generally is defined as the conditions that would result from loss of the biggest transmission line or other key facility serving an area. Analysis of the transmission system indicates that the existing transmission lines in the area cannot meet this criterion.

Voltage support under system normal conditions

In order to maintain distribution service voltages within acceptable limits, MPC generally tries to keep the voltage on its transmission system between 90 percent and 105 percent of the nominal voltage.

DNRC reviewed the electrical performance of the transmission system in the central Montana area under system normal operating conditions. Analysis of the load flow studies leads DNRC to concur with MPC's conclusion that the system needs reinforcement to provide acceptable voltage under normal conditions. Low voltages already occurred this past winter under system normal operating conditions. The rate of load growth will determine how fast the existing problem gets worse.



SOURCE: MPC 1983

FIGURE 5
EXISTING CENTRAL MONTANA TRANSMISSION SYSTEM

Reliability

Reliability in a transmission system means the ability to withstand a variety of contingency conditions without interrupting adequate service to customers.

MPC generally attempts to keep its system strong enough to serve all loads and maintain acceptable voltage levels under the worst case single outage contingency. Outages will generally be most critical during the winter peak load situation.

DNRC reviewed the performance of the existing transmission system under contingent conditions and concluded that the voltage levels at many substations in the Lewistown area are vulnerable to most outages on the existing 100-kV system during heavy winter load conditions.

The reason the area is so vulnerable lies in the nature of the existing system (see Figure 5). Under normal conditions about 23.7 MW must be brought into the Lewistown area, according to MPC's projection of 1984-85 winter peak load conditions. Almost 22 MW of this flow is on the Benchland-Glengarry 100-kV line. The 50-kV lines bring in the remainder, in addition to what is necessary to feed the intermediate substations on the 50-kV system. If the Benchland-Glengarry 100-kV line goes out of service, almost 22 additional MW must be carried on the 50-kV system. These lines have a total capacity of about 10 MW before voltage drop becomes excessive. They already are carrying almost that much under normal conditions, so there is little capacity to carry any flows diverted by the loss of the 100-kV line.

Even with present demands for power, it appears that there is virtually no time during the year that loads would be low enough for the 50-kV system to carry the entire Lewistown area besides the substations it is already supplying. Under these conditions, DNRC considers that MPC's reliability criterion, which requires reinforcement of the system, is reasonable.

ALTERNATIVES TO THE PROPOSED TRANSMISSION LINE

Nontransmission Alternatives

Nontransmission alternatives examined included local generation and conservation.

The major types of generation DNRC considered as alternatives to the proposed project are small hydro, wind turbines, and combustion turbines. The study area does not contain enough small hydro potential to yield the necessary 22-30 MW. The intermittent and unpredictable nature of the wind effectively eliminates the usefulness of wind generation as a backup for transmission outages.

DNRC's evaluation of combustion turbines found they were not an acceptable alternative because any cost advantage they have is sensitive to rises in natural gas prices, the annual operating time necessary for voltage reinforcement during the early part of the plant life, and the real discount rate.

A further problem with combustion turbines is that they would not protect against outages of less than 30 minutes.

Table 1. Comparison of MPC Alternatives

Alternative	Roundup	Stanford	Benchland	Judith Gap
230-kV tap location*	Judith Gap	Near Windham	Near Windham	Judith Gap
Miles of 100-kV line from tap to substation	0	12#	14#	0
Miles to Glengarry	74	36	27	32
Transmission line construction cost (millions)+	$4.31	$2.80	$2.42	$1.87
Substation construction cost (millions)+	$3.58	$4.63	$4.65	$4.22
Total cost (millions)+	$7.89	$7.43	$7.07	$6.09
Reduction in system losses (1984-85 winter peak) (in megawatts)	4.2	8.9	9.4	10.4

---

* Assumes use of a new substation to be built near Judith Gap for the Judith Gap to Glengarry and Roundup to Glengarry options, and a new substation southwest of Windham on the existing 230-kV line for the Stanford to Glengarry and Benchland to Glengarry options.

# Assumes use of two parallel 100-kV lines between tap on 230-kV line and the existing Benchland substation.

+ Dollars at their 1984 value.

DNRC examined energy conservation as an alternative to the proposed transmission line and rejected it. The amount of cost-effective conservation possible in the Lewistown area would not be enough to affect the need for the proposed transmission line.

Transmission Alternatives

A variety of alternative approaches to upgrading and reinforcing the transmission system was examined by MPC and DNRC. These included upgrading the existing 50-kV system by installing new 50-kV conductors on existing structures or by installing larger conductors and raising the voltage to 69-kV. Other possibilities included construction of a new 100-kV line into Glengarry without tapping the 230-kV system, and routing a new 100-kV line to Glengarry over any of several routes with a tie to the 100-kV system from various points on the 230-kV system.

A full solution to the problems on the central Montana system requires both a new 100-kV line and a tie to the 230-kV system. The 230-kV tie would greatly strengthen the 100-kV system in the area and the additional 100-kV feed to Glengarry would provide the desired increase in reliability.

MPC examined several alternative routes and taps of the 230-kV system. Table 1 summarizes mileage, cost, and effect on system line losses of the various alternatives.

The 230-kV line passes within 80 feet of the existing Harlowton-Stanford 100-kV line near the Judith Gap substation, so no new transmission line is required between the two lines if the 230-kV tap is located there. The Benchland or Stanford alternatives require construction of two transmission lines between the tap on the 230-kV line and the existing Benchland Substation. (Two lines are required to meet the reliability criterion given the voltage problems under normal conditions.) In addition to the above alternatives considered by MPC, DNRC examined another variant that would minimize the length of the transmission line. This alternative would connect the 230-kV line and the Harlowton-Stanford 100-kV line at a new Judith Gap substation and would require a new 100-kV line between the Benchland and Glengarry substations. This alternative would require only 27 miles of new line, but it would not adequately protect against outages on the existing 100-kV line between Judith Gap and Benchland.

DNRC received inquiries at its Moore public meetings regarding whether the existing 50-kV transmission line between Judith Gap and Glengarry line and the proposed 100-kV transmision line could be located on the same poles.

The poles supporting the existing 50-kV transmission line could not support the conductors of an additional 100-kV line. Combining the two lines on a common set of new poles (double circuiting) is more feasible and could be done along all or portions of the existing 50-kV route. The major disadvantage of developing a double circuit transmission system is the substantial increase to project costs.

Cost increases of $30,000 per mile would result from the need for larger structures capable of supporting the 100-kV line on one side and 50-kV line on the other, and removal of the existing 50-kV poles.

Double circuiting for the entire route would increase project costs by about $1.48 million, and be the most expensive of the final routing options under consideration. DNRC also considered double circuiting between Moore and Glengarry. This option would increase project costs by an estimated $350,000. The environmental benefits of double circuiting are discussed in Chapter Five.

Double circuiting would have minor detrimental effects on overall system reliability.

The process of constructing a new 100-kV transmission line in the right-of-way of the 50-kV line could also be difficult. For short periods, local electric supplies might be reduced in areas served by the 50-kV line. This could create inconvenience for local residents. It is likely that the increases in project cost would not be offset by the environmental benefits gained by this alternative.

SUMMARY OF NEED AND ALTERNATIVES

There is a need for voltage support under "system normal" conditions, for the transmission lines currently serving the area. Further, there is a need to reinforce the transmission system of the area in order to meet MPC's single contingency outage reliability criterion. DNRC believes that applying the MPC criterion in the central Montana area is reasonable.

All the MPC alternatives would provide both adequate voltage support under normal conditions and adequate protection against single contingency outages. The major differences among them are their cost and their affect on system losses. The Judith Gap-Glengarry alternative is the least costly and minimizes power losses in the system.

Nontransmission alternatives, except for the combustion turbine alternative, would not solve the problem. Combustion turbines are vulnerable to unpredictable variables, such as future fuel costs. Other transmission alternatives either did not provide a solution to the problem or were more costly and not environmentally preferable to the proposed project.

DNRC agrees that tapping the 230-kV system at Judith Gap and building a 100-kV line from Judith Gap to Glengarry is the preferred alternative. DNRC's route analysis and preferred route between the two points is presented in Chapter Five.

CHAPTER FOUR: SOCIAL, ECONOMIC, AND ENVIRONMENTAL CONCERNS

INTRODUCTION

Construction of the proposed project along one of the routes identified in Figure 1 could affect social, economic, and environmental resources. However, this project is small and unlikely to cause major impacts, as discussed in this chapter.

SOCIAL AND ECONOMIC ISSUES

Existing Environment

The proposed project could have social and economic effects in portions of Fergus, Judith Basin, and Wheatland counties (see Figure 1). The 1980 population of the study area is estimated to be 2,750. The average population density in the area is approximately six persons per square mile.

The communities of Hobson, Moore and Judith Gap provide a few basic trade and agriculture services. Moccasin is the largest unincorporated community in the study area. Other unincorporated communities, Utica, Buffalo, Straw, Sipple and Garneill, contain few occupied homes and provide few or no commercial services.

Most study area residents live on farms and ranches, and agriculture is the key component of the study area's economic base. The area is part of a major grain producing region of Montana, with most land used for dryland wheat and barley production. Cattle and sheep production also provide significant agricultural income.

In the Judith Gap area, logging and lumber mill operations are also an important source of basic employment. Lumber industry employment varies widely from year to year due to fluctuating market conditions. Montana State University operates an agricultural experiment station at Moccasin, which also provides basic jobs. Lewistown and Harlowton are within commuting distance of portions of the study area and provide job opportunities for some area residents.

Mobile home or trailer parks in Hobson, Moore, and Judith Gap can provide limited housing for temporary workers. Lewistown, Harlowton, and Stanford provide motel and additional trailer spaces within commuting distance of the study area.

The incorporated towns in the area have central water and sewer services, provide fire protection, and have facilities for disposal of trash and garbage. Hospital services are available in Lewistown and Harlowton. Social services and public health services and law enforcement are administered in the study area from the county seats.

The elementary schools and high schools in Hobson, Moore, and Judith Gap are not experiencing problems due to overcrowding and enrollments are stable or declining. Additional taxes provided by the project could help local school districts which have relatively small tax bases.

General Social and Economic Effects

Construction of the proposed project is estimated to cost between $6.1 million and $7.1 million depending on which route is chosen. This estimate assumes a cost of $58,000 per mile for transmission line construction, between $4.2 million and $4.6 million for construction of a new substation near Judith Gap or Benchland, and improvements to the existing Benchland and Glengarry substations.

The Judith Gap to Glengarry project could cause minor but generally beneficial short-term and long-term socioeconomic impacts in Fergus, Judith Basin, and Wheatland counties. Substation construction would create an average of four jobs for a four-month period. Transmission line construction would create an average of 20 jobs for four to five months. Employment of residents from area counties would be at the discretion of the contractor building the project. Persons having some skills necessary to build the transmission project reside in Fergus, Wheatland, Judith Basin, and nearby Golden Valley, Musselshell, and Petroleum counties. In June of 1984, the civilian labor force in these counties was 12,400 and its unemployment rate was 6.2 percent (Montana Department of Labor and Industry 1984). In its application, MPC indicated it expected some construction workers to be hired from nearby counties.

The projected payroll for transmission line and substation construction would range from $400,000 to $500,000, assuming an average wage of $19 per hour and $25 per diem.

Lewistown, which serves as a regional center for conventions and tourism, has numerous motel and camper facilities for construction workers and probably would experience the most benefit from construction worker expenditures.

The presence of nonlocal construction workers would not be expected to create any unusual demand for local government services (i.e. water, sewer). Nor should the presence of workers create unusual law enforcement problems or demand for social services. Construction would occur primarily during summer months, and the presence of nonlocal construction worker families should not affect school enrollments. In summary, the project would not affect the availability, quality or cost of public and private services in the area.

Compensation for any grain and livestock production losses during construction is expected to be included in the easement payments MPC makes to individual landowners.

Long-term displacement of a small amount of agricultural land use would cause very minor reductions in grain and cattle production. The interference of poles and conductors with farm operations could slightly increase production costs. Neither of these factors should notably affect the profitability of area farms and ranches or the overall area agricultural economy.

LAND USE

Existing Land Use

Most of the land in the study area is privately owned. State and federal holdings include scattered state school sections, small Bureau of Land Management parcels, Defense Department missile installations, and highway right-of-way. Local government holdings in the area consist primarily of roadways and town and school facility sites. Railroads are a major corporate landowner in the study area.

Agriculture is the principal land use in the area and most agricultural land in the area is used for dryland farming. Livestock grazing is the area's second most prevalent agricultural land use, especially in hilly areas and on poor soil.

Low-lying areas near rivers and creeks are often used for flood irrigated cropland or pasture. There has been a gradual increase in the amount of mechanically irrigated cropland in the study area. Only a small percentage of the total agricultural land in the area is irrigated.

The Milwaukee Road retains ownership of unused railroad right-of-way from the vicinity of Judith Gap to a point south of Sipple. The Milwaukee Road has attempted to sell this right-of-way but has been largely unsuccessful. A group of Montana landowners, including residents of the study area, has initiated a lawsuit contending that upon discontinuation of rail service, ownership of the railroad right-of-way reverts to adjoining property owners.

Highways in the study area are U.S. 87 (Montana 200), which runs east-west between Lewistown and Great Falls, and U.S. 191 which runs north-south between Eddie's Corner and Harlowton. Highway right-of-way in the study area is typically 80 to 100 feet wide.

County roads in the study area generally run along township section lines and vary from improved gravel surface roads to single lane dirt roads used by farm equipment. Much of the county road right-of-way is not used as a road and has been encroached upon by farm activities.

There are seven small airfields in the study area. Most of these are privately owned and operated and do not have electronic communication equipment or lighting. Because of prevailing winds, landing strips are generally oriented east-west. New transmission poles and conductors could pose particular hazard to aircraft if they were located perpendicular to the glide path of a runway.

Land Use Impacts

Agricultural Impacts

Where routes would be located along county roads or county right-of-way, it would be possible to reduce construction interference with agricultural land uses. County road and railroad right-of-way could provide access and working areas for construction activities. Confinement of construction activities to existing right-of-ways would minimize agricultural impacts.

Any cropland affected by transmission line construction could be expected to lose one year's production. At an average structure spacing of 450 feet, poles would displace approximately .04 acres per mile, half of which would normally be in fallow. This estimate of land use displacement would reduce annual dryland wheat or barley production by less than 2 bushels per linear mile. Displacement could be reduced by locating poles along road right-of-way, fencelines, and field boundaries.

Careful selection of structure types to be used and placement of the structures when crossing farmland will reduce the amount of land taken out of production by poles and will minimize interference with farm machinery operation.

Farmers and ranchers are also concerned about the effects of a transmission line on the safety of aerial spraying, and operation of field machinery. The presence of a transmission line may preclude aerial spraying in some areas of fields, requiring ground level application of chemicals. In parts of the study area, coyote control is conducted by helicopters. Concern was expressed at public meetings regarding possible tower and conductor interference with this practice. Accidental collisions of farm equipment with power poles do occur. Farmers are concerned about the potential costs of equipment repairs and the ramifications of having an important piece of equipment inoperative at a crucial time.

Some study area farmers and ranchers expressed concern that the transmission line could adversely affect the market value of their agricultural land.

Weeds and Weed Control: Weeds may invade areas which have been disturbed by construction activities. In areas that have had native vegetation disturbed or removed, a good seedbed is available for pioneer species, including noxious weeds. Seeds can be transported into these areas by natural means and by the activities of man. Weeds can reduce the productivity of range and cropland, thus leading to economic losses to the landowner.

The abandoned Milwaukee Road right-of-way is a source of weeds, with leafy spurge, spotted knapweed, and Canadian thistle all growing there. Control of weeds on the railroad right-of-way would benefit farmers.

Residential Land Use Impacts

During project construction, noise, dust, loss of privacy, and visual effects could temporarily interfere with activities of households located near line right-of-way, access roads, construction staging areas, commuter routes, and material hauling routes. Construction activities are expected to progress rapidly along the approved route and should be of small scale.

Transmission lines can cause interference with radio and television signals near the line. Residents indicated that television and radio signals in the study area are of generally poor quality. Local telephone service also suffers from periods of poor audibility. Even during bad weather, interference with commercial broadcasts would not occur within homes more than 600 feet from the line (March 1983). The transmission line could also interfere with use of two-way FM radios, which are used much like local telephone systems by farms and ranches in the area. This FM radio reception may be affected depending on the frequency.

There sometimes is concern about the effects of electrical fields on human health. The electrical field at the right-of-way edge of MPC's proposed 100-kV line is weaker than fields produced by household appliances and low-voltage wiring, and will cause no risk to human health.

AESTHETICS

Existing Environment

The study area for the transmission line project lies within the Rocky Mountain Foreland subregion (Environmental Quality Council 1972). It is characterized by broad plateaus with gently rolling topography which slope upward to surrounding mountain ranges including the Big Snowy, Little Belt, Judith, and Highwood mountains.

Tree cover is largely confined to mountain ranges and foothills, with rangeland interspersed in these areas of rougher topography. Ross Fork Creek and the Judith River, major streams in the study area, flow northeasterly, collecting tributary flow from the mountain ranges.

Views within the study area are typically expansive, extending over broad valleys of agricultural fields and farmsteads to distant mountain ranges that define the periphery. Throughout the year fields vary in color and texture, creating changing patterns against the backdrop of mountains.

Aesthetic Impacts

DNRC's analysis indicated that viewer interest in the scenery and potential visual impacts from the proposed project were low to moderate in the study area. This analysis was based on conversations with area landowners, comments at public meetings, and surveys conducted by MPC during its application study. The proposed transmission line is much the same as existing transmission lines in the study area and would cause few additional impacts.

Some degree of visual alteration will still result from introduction of structures, conductors and access roads to the landscape where none were present before.

RECREATION

Existing Environment

Recreation activities within the central Montana region are primarily on public lands such as the Lewis and Clark National Forest which lie outside of the study area. The study area is almost exclusively privately owned, affording some limited dispersed hunting, fishing, and snowmobiling opportunities.

Recreation Impacts

Impacts to recreation activities is not anticipated from this project because of the dispersed nature of recreation in the area. However, area landowners, especially those bordering national forest lands along the foothills of the Big Snowy Mountains, expressed concern over increased trespass problems from hunters using new access roads across their property.

GEOLOGY AND SOIL

Existing Environment

The project area is situated in central Montana on a broad, gently rolling plain between the Little Belt Mountains to the west and the Big Snowy Mountains to the east. There are remnants of several large terraces in the foothills north of Sipple, including the benches adjacent to Beaver Creek and Cottonwood Creek. There are several additional terrace remnants at still higher elevations as far south as Judith Gap.

Although the area is generally flat, there are slopes of 15-25 percent in the foothills. There are steep (20-30 percent) slopes along Beaver Creek, the Judith River, and the northern portions of Ross Fork Creek.

Soil textures range from stony or gravelly loams on the flat alluvial terraces to clays and clay loams in the areas underlain by shale. Soils in the area are generally well drained, but are subject to compaction. Soils, on steeper slopes, are subject to erosion and slope failure during periods of runoff. This potential is increased when vegetation cover is removed.

Geology and Soil Impacts

The primary effects of transmisson line construction on soil are compaction and erosion. Off-road vehicle travel is likely to cause some degree of compaction on all routes, but the degree of compaction will vary with the type of equipment a contractor uses, the amount of vegetation (root mass) found in an area, the soil type, and the amount of moisture in the soil during construction.

Soil compaction can result in decreased water infiltration, poorer soil aeration, and can reduce nutrient uptake by crops in low fertility soil (Byrnes et al. 1981, Chancellor 1977). Seedling emergence and root development can be reduced by compaction. A study by Ontario Hydro (1979) showed that corn and small grain yields could be reduced by compaction from transmission line construction traffic.

Soil erosion can be accelerated either through removal of vegetation which protects the soil particles from rain and wind, or by compacting soil, which can lead to decreased water infiltration and increased runoff. Construction of access roads and leveling areas for crane landings are among the activities that remove vegetation during transmission line construction. Road cuts will be necessary in areas with more than a 4 percent sideslope. The amount of cutting will depend on final location of the access roads.

Stream sedimentation could become a problem if the vegetation is removed along stream banks or on steep hillsides next to streams. Reclamation measures are expected to reduce long-term (longer than 5 years) erosion and are presented in Appendix B.

There are saline seeps in some low-lying groundwater discharge areas. Soil in these saline seeps typically contains high amounts of clay which provide low-bearing strength when wet, and remains wet longer than the surrounding land. Consequently, construction vehicles may become mired or cause extensive rutting when crossing these areas. The seeps crossed by potential routes of the proposed transmission line are generally small and in most cases can be avoided by placing structures on each side of the seep and by routing access roads around the seep area.

Low-lying areas in floodplains, such as those adjacent to Ross Fork Creek, retain moisture longer than the adjacent upland. If these areas are crossed when wet, vehicles may become mired and cause rutting. Most of these areas are avoidable.

The study area has not recently displayed major seismic activity and is located east of seismic risk zone 2 (Montana Bureau of Mines and Geology 1984). Earthquake potential is not considered a route determining factor in this case.

Construction of the transmission line would not cause any signicant impact to groundwater.

FISH, WILDLIFE, AND HABITATS

Existing Environment, Aquatic Life and Habitats

The Judith River and the lower reaches of its tributaries support a variety of warm-water fish species. The upper reaches of the tributaries to the Judith River, especially in the foothills of the Big Snowy and Little Belt mountains, support a cold-water trout fishery, including brook trout with a few browns and rainbows, but most high-quality trout habitat is in mountain streams upstream from the study area. None of the streams in the study area are classified by the Montana Department of Fish, Wildlife and Parks (MDFWP) as Class 1 (highest-value fishery resource) or Class 2 (highest-priority fishery resource), and none are believed to support populations of threatened or endangered fish species or of fish designated by MDFWP as species of special interest or concern. The waters in the study area are not heavily used by fishermen because much better trout fisheries exist nearby (Poore 1984).

Impacts to Aquatic Life and Habitats

Impacts on aquatic resources would be limited to possible increases in sedimentation and introduction of toxic substances such as herbicides into streams. Clearing of streambank vegetation may result in increased water temperatures and impacts to fish, but the amount of streambank vegetation which would be affected is minimal.

These impacts can readily be reduced or avoided. Given the marginal fish habitat in the study area, the project should not cause significant impacts to aquatic life and habitats. Measures for avoiding or reducing impacts are included in Chapter Six.

Existing Environment, Wildlife and Habitats

Vegetation in the study area consists primarily of crops, mostly dryland wheat but includes some irrigated crops. There are areas of native grassland occurring at higher elevations near the foothills of the Big Snowy Mountains. Wetland cottonwoods and shrubs are scarce in the study area and are found primarily along lower Ross Fork Creek and the Judith River.

Of the many wildlife species and habitats known to occur in the study area, DNRC considers relatively few vulnerable to significant harm from powerline construction and operation. Great blue herons, sharp-tailed grouse, hawks, and owls are found in the study area, but no active nest sites or breeding areas are known. There are a few bald eagles along the Judith River, usually during winter, but no active nests or critical winter roost sites are known.

Although the study area does not support large concentrations of waterfowl, many small ponds are scattered throughout the study area and support small breeding waterfowl populations. Sandhill crane use is relatively high along Ross Fork Creek below Highway 87 and Cottonwood Creek below Glengarry (Watts 1984).

The study area is used by antelope, mule and white-tailed deer, and elk. In general, the study area does not provide high security summer-fall habitat for deer and elk. The foothills of the Big Snowy Mountains along the eastern edge of the study area provide winter range used primarily by mule deer. Wintering herds of elk occasionally range into this portion of the study area.

Impacts to Wildlife and Habitats

Major types of potential impacts this project could have on wildlife in the area include disturbance of animals at special use sites (winter ranges, breeding, nesting, or roosting areas), damage to habitat from clearing, construction of new access roads, and increased bird deaths due to collisions with wires. There are no known prairie grouse dancing areas or great blue heron colonies in the study area, and if sites are found during centerline study, steps can be taken to avoid them. Although hawks, owls, and eagles are found in the study area, potential for impact is low. The study area does not contain waterfowl concentrations of a magnitude to create significant hazards, the collision rates for the routes studied are expected to be very low and are not expected to cause a major impact to bird populations. Impacts to wildlife species in the study area can readily be reduced or avoided, so the project is not expected to cause significant impacts of this type.

HISTORICAL AND ARCHAEOLOGICAL RESOURCES

Existing Environment

There are no known archaeological sites that could shed light on the prehistory of the study area. However, knowledge of cultural history suggests that a wide variety of activities could be represented in undiscovered archaeological remains in the Judith Basin, including tipi rings, bison kill sites, and rock quarries.

The study area contains a number of historical sites and can be expected to contain a variety of archaeological or paleontological sites. Twenty-five historical sites, including homesteads, roads, and historic communities, are found in the study area. The Judith Gap was a major pass between the Musselshell drainage to the south and Judith Basin to the north, but there are no known prehistoric or paleontological sites in the study area.

Impacts

Archaeological sites could be discovered and disturbed as a result of road construction or structure excavation. An indirect impact, such as vandalism, could result from increased access to formerly inaccessible sites. Setting is important to some categories of historical and archaeological sites and construction of the line could alter characteristics of a setting, possibly affecting the eligibility of nearby sites for listing on the National Register of Historic Places.

Impacts to historical and archaeological resources for this project would be primarily visual. Measures can be taken to reduce or avoid potential impacts (see Chapter Six).

CHAPTER FIVE: ROUTE COMPARISON

INTRODUCTION

In evaluating possible locations for the transmission line, DNRC considered engineering requirements, economic costs, environmental impacts, and public concerns. The term "line" as used in this chapter pertains to route centerlines shown in Figure 1. The lines shown in Figure 1 are not precise, because the route study process leaves substantial leeway for final location of the proposed transmission line to allow avoidance of unsuitable areas such as farmsteads, landslide areas, and irrigated fields. This flexibility makes it possible for landowners and DNRC to influence MPC's selection of the precise location of the transmission line within an approved route. DNRC has attempted to identify areas that can be narrowed or more precisely defined for each route. This narrowing process is presented in greater detail in a later section of this chapter.

Beginning with MPC's alternative routes, DNRC added other possible locations suggested by persons at public meetings or in personal interviews. These alternatives included a location along the Burlington Northern Railroad between Moore and Glengarry and segments which leave east-west county roads south of Moore and head directly north to the railroad and then on to the Glengarry Substation. Possible adjustments to MPC's preferred location along the foothills of the Big Snowy Mountains also were identified (see Figure 1).

DNRC attempted to determine possible problems and discover opportunities to solve problems through line relocation or other measures within a feasible route. Probable impacts and public comments at two meetings held in the area were considered in identifying the routes studied. These locations, as shown on Figure 1, are called the Benchland, Railroad, Crossover, Foothills, and Modified Foothills routes. Other possible alternatives less suitable than these were dropped from further consideration, though they are also shown in Figure 1.

The Board, in approving a route, also specifies a route width in which the line must be located. Once a route is approved by the Board, DNRC, MPC and landowners will evaluate final locations for the line within the route through a process called centerline evaluation.

This chapter compares impacts of the various routes and identifies those areas where a route could be narrowed to take advantage of siting opportunities. DNRC's preliminary recommendations are presented in Chapter Six.

DESCRIPTION OF ROUTES

DNRC examined possible opportunities for locating this line with minimal overall impact. In some cases, these opportunities require the route to be narrowed because of unique circumstances such as the availability of railroad or road right-of-way or an existing transmission line right-of-way. In other areas, topography or man-made developments may limit line placement. Where possible siting problems exist, DNRC is considering wider routes to allow flexibility in determining the final location of the line.

Foothills Route and Modifications

This route is MPC's preferred location for the transmission line and is shown in Figure 1. It avoids homes and dry cropland to a great extent and is located primarily on rangeland. One area where homes would be difficult to avoid is the Beaver Creek drainage south of the existing Glengarry Substation. Except for the area just north of Judith Gap and south of the Glengarry Substation, this route would not follow any existing linear facilities.

In discussions with landowners, DNRC found there are three portions of the MPC route that landowners would like to change. These changes and the resulting route generally following the Foothills Route are shown in Figure 1.

Crossover Route

This route, shown in Figure 1, would use portions of the abandoned Milwaukee Road right-of-way and county road right-of-way for much of its length to reduce potential impacts to agricultural land. In the area of the Beaver Creek drainage, the Crossover Route and Foothills Route are identical.

Railroad Route

The Railroad Route in Figure 1 makes the most use of the Milwaukee Road, Burlington Northern Railroad, county road, and existing transmission line right-of-way between Judith Gap and Glengarry.

Benchland Route

This route as shown in Figure 1 would begin at a point on the Great Falls 230-kV line about 5.5 miles southwest of Windham. Most of this route would follow the existing Benchland to Glengarry 100-kV line.

ROUTE COMPARISONS

Public interest in the transmission project was focused on the location of the transmission line and substations, rather than the need for the project. Comment at public meetings strongly supported siting of the transmission line within the Milwaukee Road's abandoned right-of-way. Support for using the railroad right-of-way was also expressed by many persons in individual interviews. All persons who attended meetings held by DNRC or were interviewed by DNRC indicated that they preferred routes located away from them. However, persons owning land adjoining the right-of-way generally acknowledged that a transmission line on the right-of-way would have the least impact.

Impacts Common to All Routes

All routes evaluated by DNRC would have similar social-economic, radio-television, and cultural resource impacts.

Social and Economic Impacts

The nature of general social and economic impacts would not vary substantially from route to route. Short-term economic effects are virtually the same for all routes.

Cumulative property taxes to be paid by the project would be about the same for each route. However, because routes would cross different taxing jurisdictions, schools and counties benefiting from taxable valuation increases would vary according to which route is selected. In short, the project could slightly increase tax revenues or slightly decrease area mill levies.

Radio and Television Interference

Impact reduction measures generally used by MPC can eliminate radio and television interference. Judicious placement of the line by DNRC, MPC and landowners can further reduce the potential for impact.

Historical and Archaeological Impacts

There are cultural resources in the study area but the number of sites and their relative values do not differ from route to route. Harmful impacts this project would cause to cultural resources probably would not differ from route to route.

In evaluating this project, DNRC and the SHPO have determined that any difference among routes is small and that protective measures can be applied most effectively after a route has been selected. Measures for evaluating and mitigating impacts to cultural resource properties or sites are discussed in Chapter Six.

Comparison of Cost and Environmental Impacts of the Alternative Routes

In selecting a preferred route for this project, DNRC focused on selecting a route that would minimize environmental impacts at a reasonable economic cost, given the alternatives. The Foothills Route with adjustment and the Crossover Route were identified as the most feasible. The following section describes reasons for elimination of the Benchland and Railroad routes. A later section compares the Foothills Route with the Crossover Route and states DNRC's preference. Table 2 summarizes the information considered by DNRC in evaluating the alternate routes.

Routes Eliminated from Consideration

The Benchland and Railroad routes were eliminated from consideration because of adverse impacts that could not be cost-effectively reduced.

DNRC eliminated the Benchland route from consideration following initial comparison. As shown in Tables 2 and 3, the Benchland Route would cross the most agricultural land and would locate the line close (within 500 feet) to the greatest number of homes. The logical location for the new line would be adjacent (80 feet away) to the existing Benchland to Glengarry 100-kV line. However, it would not be possible to avoid homes along the line without moving farther from the existing transmission line. Any movement to avoid homes would result in greater impact to cultivated cropland. Further, as discussed in Chapter Three, although this alternative would eliminate some weaknesses in the existing power supply system, it would be less effective than a line between Judith Gap and Glengarry. For these reasons, DNRC dropped this route from further consideration.

The Railroad Route was further examined by DNRC but eventually elminated from consideration. It would allow maximum use of Milwaukee Road, Burlington Northern Railroad and county road right-of-way between Judith Gap and Glengarry. This route

Table 2. Summary of Length, Cost and Environmental Resource Concerns for Possible Routes

CONCERN	ROUTE					
	Benchland	Foothills*		Crossover	Railroad***	
Length (miles)	41***	32	(35)	35.6	34	
Cost (millions)	$7.1	$6.1	($6.3)	$6.4	$6.3	($6.6)
Aesthetic Impacts****	moderate	low		moderate	moderate	
Number of residences within 500 feet	10	4	(03)	7	6	
Number of residences within 1/2 mile	20	17	(18)	35	30	
Visibility to highway travelers	low to moderate	low		moderate	moderate	
Potential for landscape alteration	low	moderate		low	low	
Impact to Wildlife	low	low to moderate		low	low	
Impact to Fisheries	low	low to moderate		low	low	
Impact to Geology Soil	low to moderate	moderate to high		low to moderate	low	
Public Acceptance	low	low		moderate	high	
Land Use Impacts						
Residential land use	moderate to high	low		moderate	moderate	
Agricultural land use	high	moderate to high (low)		low	low	
- mechanically irrigated cropland crossed (miles)	0.0	0.1	(0.0)	0.0	0.0	
- dry cropland crossed (miles)	14.8	6.4	(2.8)	2.2	3.6	
- meadow lands crossed (miles)	1.4	1.1	(0.5)	0.6	1.1	
- rangeland crossed (miles)	15.3	18.5	(20.6)	4.8	1.2	
- railroad and county road right-of-way used (miles)	0.0	5.9	(8.9)	28.0	28.0	

*Where a measurement for the Modified Foothills Route differs from that for MPC's Foothill's Route, it is shown in parentheses. Otherwise they are the same for the two routes.

**Where a measurement would be difficult for the double circuit option along the Railroad Route, it is shown in parentheses. The total amount of agricultural land crossed by the railroad route would not decrease or increase under the double circuit option because the existing 50 kV line would be removed and the new double circuit poles would replace it in the same location.

***Assumes a total of 41 miles of 100-kV line, including two 100-kV lines between the tap on the 230-kV line and the existing Benchland Substation.

****Aesthetic impacts result from the line's proximity to residences, visibility to highway travelers and its potential for landscape alteration.

Table 3. Advantages and Disadvantages of the Alternative Routes

Advantages	Crossover Route	Foothills Route	Railroad Route	Benchland Route
	- Uses Milwaukee Road and county road right-of-way to locate line away from private agricultural land, potential impacts on farming operations highly mitigable during centerline study. - Would reduce areawide weed problem if weed problems in Milwaukee Road right-of-way are addressed. - Low new access road requirements. - Has support of local landowners if MMilwaukee right- of-way if used to locate line.	- Crosses little cropland and most impacts are mitigable during centerline study. - Avoids residences and highways to greatest extent.	- Uses Milwaukee Road, Burlington Northern and county road right-of-way to reduce potential for impact on private agricultural land. - Has support of local area residents.	- Provides greatest short-term economic benefits and long-term tax benefits to study area.
Disadvantages				
	- Has highest number of people within 1/2 mile of line. - Visible from Gerneill, Strew, Buffalo areas and from the highways. - Control of weeds on Milwaukee Road right-of-way could be costly. - Crossing of Beaver Creek area may be difficult. - Interference with farming practices in county road right-of-way. - Potential conflicts with highway construction and railroad expansion in Sippla area	- Crosses most privately-owned agricultural land. - Low amount of new access roads. - Highest potential for landscape alteration and erosion. - High potential to spread weeds to new areas. - Strong opposition voiced by people attending DNRC public meetings. - Has the same Beaver Creek crossing problem as the Crossover Route.	- Unresolved conflicts with expansion plans of Burlington Northern and Department of Highways. - Shares the problems of Crossover Route, including high number of residences, high visibility from towns and highways, weed control costs, and Beaver Creek crossing.	- Most expensive. - Crosses most private cropland, impacts have limited mitigation potential, agricultural interference made worse by parallel line. - Public strongly opposed during MPC siting study. - Crosses waterfowl areas at Judith River and Ross Fork Creek. - Most residences within 100 feet of the line.

was evaluated for possible location of the line within or immediately adjacent to existing right-of-way to reduce possible land use impacts. As indicated in Table 3, the route would have several advantages if the line could be located within existing right-of-way. However, as shown in Table 3 and discussed below, the route has several disadvantages that make it unattractive as an alternative route.

The Railroad and Crossover routes share the potential to conflict with proposed railroad and highway expansion projects near Sipple. While these problems could be minimized, the Railroad Route could also interfere with possible improvements by Burlington Northern for the Moore to Lewistown spur line which may be more difficult to mitigate.

To avoid conflicts with existing farming operations between Moore and Glengarry, the line's location would have to be between the railroad tracks and Highway 87 to the north. This location could create a hazard to highway traffic. Two miles of the line would be located within 30 to 50 feet from the edge of the highway. West of Beaver Creek the existing transmission lines and the railroad diverge. In this area the line would parallel MPC's 50-kV and 100-kV lines across farmed land. This would compound existing interference with agricultural operations by placing additional structures farther out into the fields.

As shown on Figure 1, the Railroad Route jogs around the town of Moore following county road right-of-way. The route passes east of the town's landing strip and could create a hazard to its future use if it were to reopen.

DNRC investigated several options for the railroad right-of-way including installation of the proposed 100-kV line on a new set of poles along the route of the existing 50-kV line, with subsequent installation of the 50-kV conductors on the same poles. Although this alternative is possible, it would result in higher construction cost, as discussed in Chapter Three, and would not eliminate land use conflicts with the Moore landing strip and the Burlington Northern railway improvement. These disadvantages led DNRC to drop further consideration of this route.

Comparison of MPC and DNRC Preferred Routes

Following its evaluation, DNRC concluded that the modified Foothills and Crossover Routes are the best alternatives. Tables 2 and 3 show the advantages and disadvantages of these routes. Routes were compared to determine which of them would best avoid conflict with existing land uses and minimize other environmental impacts and economic costs. The routes share a common siting problem in the Beaver Creek area. Weeds will be an issue on either route.

The Foothills Route generally avoids homes. It crosses mostly rangeland, along with some dry cropland and meadows in the lower areas. Adjustments evaluated by DNRC and local landowners would reduce agricultural and residential impact by locating the line at the edge of fields and along property boundaries (Figure 1).

Because of the terrain crossed and limited access along the foothills of the Big Snowy Mountains, it is likely that some road cutting would be required for construction, resulting in moderate to high potential for erosion and visual changes to the landscape. In the area of East Buffalo Creek, an adjustment of the line downslope was evaluated by DNRC and a landowner to reduce concerns over trespass and increased access to a semi-roadless area.

The most difficult section of this route would be in the Beaver Creek valley on the way to the Glengarry Substation. This problem is the same as encountered by the Crossover Route (see Figure 6).

The Crossover Route would locate the line within 1/2 mile of more homes than any other route. However, area landowners did not consider potential visual impacts an important determinant for route location and considered land use more important. This route would cross less private agricultural land than the Foothills Route if railroad and county road right-of-way were used. Further, the potential for erosion and need for additional access would be much less than for the Foothills Route. As with the Foothills Route, impacts would be difficult to avoid in the Beaver Creek area.

Beaver Creek Area Siting Problems. Figure 6 shows routing options DNRC is considering for the Beaver Creek drainage. As shown in Figure 6, the area has a complicated pattern of agricultural and residential land uses. The options being evaluated attempt to minimize land use conflicts by providing a low impact line location through the area. The Beaver Creek area is one where the DNRC is recommending adoption of a wide route—up to 2.5 miles in width—to allow flexibility in selecting a final location for the line.

As Figure 6 shows, the area farther south affords greater opportunity to maintain an acceptable distance from homes while still avoiding fields. From Glengarry to the Glengarry Substation, any route to the substation from the south probably would pass near occupied residences and require that cultivated fields be skirted or crossed.

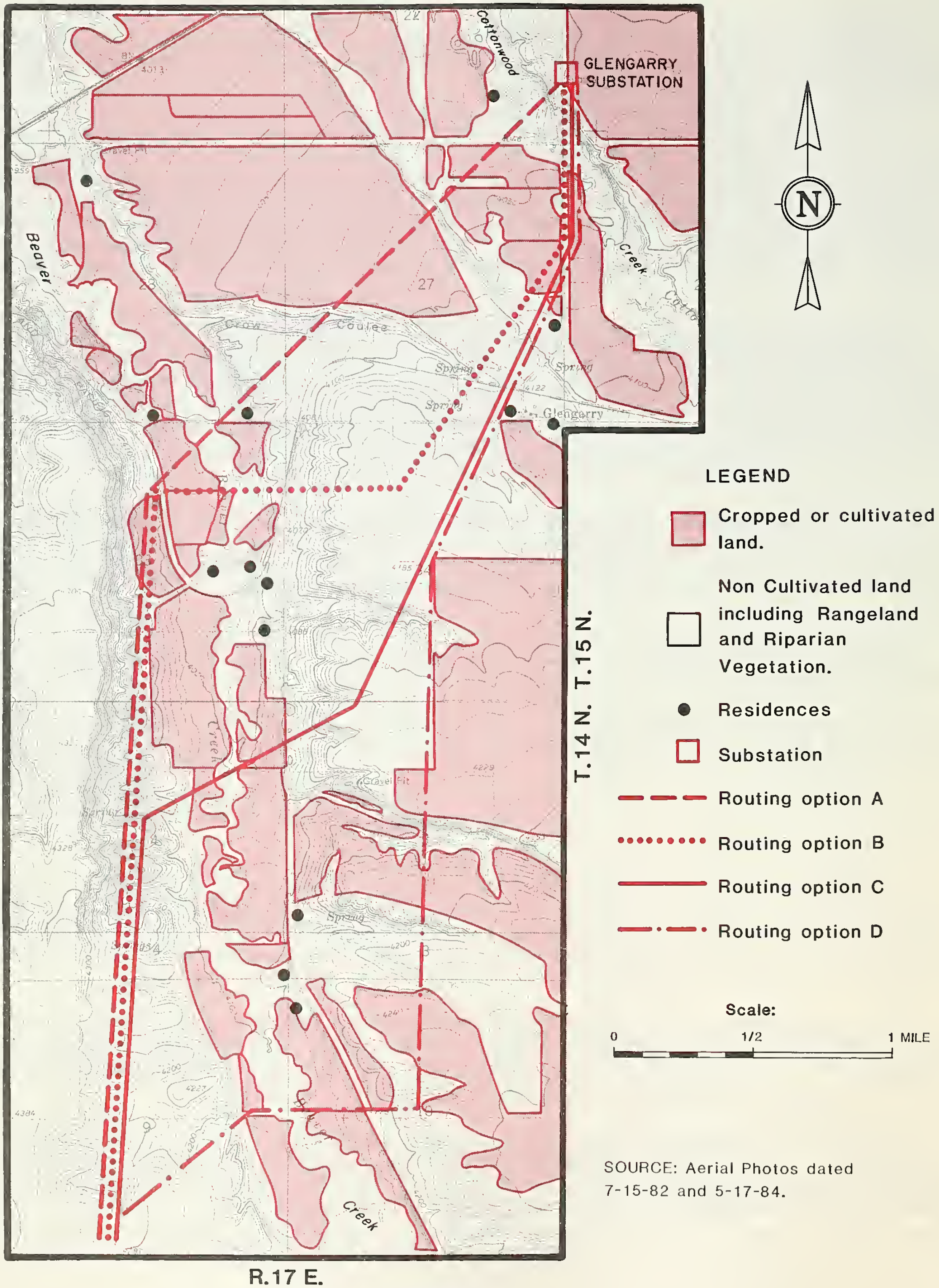
Weeds and Weed Control. Weeds and weed control are another concern that differentiates the Foothills and Crossover routes.

The abandoned Milwaukee Road right-of-way is an existing weed source which contributes to the problem of weed proliferation and weed control in the study area. Portions of this right-of-way north of Judith Gap are shared by the Foothills and Crossover routes. Construction vehicle traffic could transport weed seed from portions of the route on the right-of-way to other areas. Measures can be taken to reduce but not eliminate this potential.

Greater soil and vegetation disturbance could occur from access road building and other construction activities in the steeper terrain crossed by the Foothills Route. Until desirable ground cover species could be reestablished, weeds could spread along new access roads and other areas disturbed by construction activities, creating additional weed problems.

Most terrain along the Crossover Route is level and existing access could be used. Spread of weeds to other portions of the route may be less of a problem since construction on this route would not cause much soil or vegetation disturbance and existing farming practices would help control weeds.

Control of well-established stands of weeds could be difficult and costly for any portions of the Milwaukee Road right-of-way used by the routes. Attempts to revegetate the right-of-way could be complicated by the residues of soil sterilants that were used to control weeds when the railroad was operational.



SOURCE: Aerial Photos dated 7-15-82 and 5-17-84.

FIGURE 6
BEAVER CREEK ROUTING OPTIONS

If weed control were undertaken on the right-of-way, it would be almost essential to control the weeds on the entire 90-foot wide railroad right-of-way rather than just on a 40-to-60 foot wide easement, because weeds would tend to repopulate the easement from the untreated right-of-way. Although control of weeds on the railroad right-of-way would benefit farmers, it could be costly.

The County Weed Control Act, administered by local weed boards, makes it unlawful to permit any noxious weed to go to seed. This applies "to all persons, partnerships, corporations, or companies owning, occupying, or controlling lands, easements, or rights-of-way..." (MCA 75-22-2107(2) MCA). If MPC purchases a right-of-way or easement on a portion of the railroad right-of-way, the act may require it to assume some responsibility for the existing weed problem.

Control of weeds through cooperative arrangements with landowners, counties, or Milwaukee Road would be beneficial to the adjacent landowners who now must control weeds that spread from the right-of-way, and also would reduce MPC's possible weed control costs. DNRC is investigating options for such agreements and will report this information in the final EIS.

Ownership of the Milwaukee Road Right-of-Way

A question exists on the present ownership of the abandoned Milwaukee Road right-of-way. Milwaukee Road says it still owns the land and has issued quit claim deeds to several landowners near Sippla and Burlington Northern for the track and right-of-way between Moore and Lewistown. Landowners in Montana, including some in the study area, have filed suit against Milwaukee Road, claiming that once abandoned, the land in the right-of-way reverts to them. The uncertain ownership of the right-of-way causes some concern for MPC because it would have to obtain an easement or other rights if the line were to be built on the right-of-way.

Results of Route Comparisons

In the opinion of DNRC, the route which offers the best potential for minimizing adverse impacts, given the nature and economics of the alternatives, is the Crossover Route. Impacts to land use and residences in the Beaver Creek area are shared by both the Foothills Route and its modifications, and the Crossover Route. These routes have somewhat different impacts on the various resources, but cumulative impacts and costs of the routes are comparable.

The Crossover Route differs from the Foothills Route and its modification in that adverse land use and visual impacts along most of its length are mitigable. The location of the line along the Milwaukee Road and county road right-of-way will provide better opportunity to minimize land use conflicts. Visual impacts to residents, and highway travelers along this route are more than those of the Foothill's Route, but the line is small and would not signficantly affect the aesthetics of the area. Further, public comment supports the use of the abandoned railroad right-of-way as a means to reduce land use impacts. Other advantages to this route include: requirement for less new access road, and low risk of erosion. While all routes between Judith Gap and Glengarry have potential for weed problems, DNRC considers the potential for the spread of weeds to new areas to be less along the Crossover Route.

Route Widths Considered

The Foothills Route could be narrowed to a minimum width by following the Milwaukee Road right-of-way for a short distance north of Judith Gap. It also narrowed along the segments where DNRC recommends changing MPC's proposed route in response to landowners (see Figure 1). DNRC is considering a wider route -- up to 2.5 miles -- in other areas to provide greater flexibility in some environmentally sensitive portions of this route, such as steep slopes on the foothills of the Big Snowy Mountains and in the Beaver Creek drainage.

For most of the Crossover Route a very narrow route is possible within or immediately adjacent to the Milwaukee Road or county road right-of-way. Wider areas for this route, again up to 2.5 miles, are proposed near Sipple and in the Beaver Creek drainage.

For these reasons, DNRC prefers the Crossover Route. This preference is conditional pending further study of the costs of controlling weeds along the Milwaukee Road right-of-way, and investigation of possible cooperative cost-sharing agreements to reduce the possible weed control problem.

CHAPTER SIX: CONCLUSIONS AND PROPOSED RECOMMENDATIONS

INTRODUCTION

In evaluating the proposed project, DNRC has reached conclusions about the need for the project and its likely environmental impacts in the central Montana area. This chapter presents DNRC's preliminary conclusions, proposed recommendations to the Board, and measures to reduce impacts of the project.

CONCLUSIONS

Need

DNRC's analysis indicates that under normal system conditions voltage levels for the central Montana area during heavy winter load periods are unacceptably low and need reinforcement. The problem can only get worse as loads grow.

Outages on the existing 100-kV transmission line system during winter periods are another concern. Voltage levels in the Lewistown area are vulnerable to most outages on the existing 100-kV system, which supplies most of the power to the area. The 50-kV system is not strong enough to carry all loads in the area during cold winter conditions. Even under lighter loading conditions an outage can drop voltage levels far below acceptable limits, indicating that reinforcement is required to improve system reliability.

The best solution to problems on the central Montana electric supply system is a new substation to tap the Broadview-Great Falls 230-kV transmission line (for voltage support) and a 100-kV transmission line between the new substation and the Glengarry substation (for reliability).

DNRC's Preferred Route

DNRC considers the Crossover Route superior on the basis of environmental considerations, public concerns, and opportunities to locate the line with minimal impact and cost as stated in Chapter Five. This preference could change if DNRC concludes that the cost of weed control associated with the route is excessive. The cost of weed control and options for minimizing the cost are being explored by DNRC and MPC.

PROPOSED RECOMMENDATIONS

1. DNRC proposes to recommend that a new substation be built near Judith Gap to tap the 230-kV system, and that a new 100-kV transmission line be built between this substation and the existing Glengarry Substation.

2. DNRC further proposes to recommend that construction of the new substation should begin after the Board approves a route but before it approves a final centerline. This action would help raise voltage levels on the existing transmission system as quickly as possible.

3. DNRC proposes to recommend the Crossover Route as the preferred route.

4. DNRC proposes to recommend adoption of the following measures to prevent impact along the route approved by the Board.

Selection of a Centerline and Monitoring

After a route is selected, DNRC proposes to assist in determining the exact location of the line to avoid specific impacts. Further, DNRC will develop a detailed set of environmental specifications spelling out specific measures to be taken. This effort will culminate in DNRC's monitoring of construction and reclamation to ensure the environmental specifications are followed (see Appendix B).

Adoption of DNRC Construction Specifications

There are numerous methods for reducing construction-related impacts to area streams and soil including (1) using existing access roads to the greatest extent possible; (2) installing culverts or bridges at road crossings of year-round streams or using fords where they would have less impact; (3) avoiding fording of streams; (4) locating poles and associated construction disturbance far enough from streams to prevent sediment from reaching the water; (5) preventing loose fill from entering streams; (6) prohibiting off-road vehicular travel when soil moisture is high, implementing measures to reduce soil compaction and restoring any areas that become compacted; (7) preventing or limiting construction activity in streambeds or floodplains; and (8) locating sanitary facilities, chemical storage areas, and vehicle maintenance areas such that there is no possibility of accidental spillage into watercourses.

Specific measures to reduce these impacts are suggested in the Standard Environmental Specifications for Transmission Lines 100-kV and Above. DNRC recommends adoption of these for this project (see Appendix B).

Measures to Reduce Visual Impacts

Visual impacts could be limited by the use of natural colored wood pole structures and dark brown insulators. DNRC recommends that these measures be implemented along the entire length of the route selected. Reclamation of areas scarred during construction is covered in the environmental specifications (Appendix B).

Measures to Reduce Radio and Television Interference

The environmental specifications will require MPC to correct any radio and television interference. MPC can install remote antennas, repeater stations, stronger radios, or mechanical corrections to homeowners' antennas if problems are found. A consultant retained by MPC has recommended that the line be energized before any measures are taken to prevent interference, and that MPC contact nearby homeowners afterwards to determine if reception has been affected. If reception has been affected, MPC would correct the problem (March 1983). DNRC concurs with this recommendation which, if followed by MPC, would eliminate radio and television interference.

Measures to Reduce Historical, Archaeological, and Paleontological Impacts

Once a route is selected, cultural resources must be addressed on a site-specific level. Either intensive inventory or an inventory based on a professionally justified predictive model must occur early enough to permit development of mitigation or avoidance measures. Visual impact to historic farms, towns, schools, trails, and other community gathering spots is particularly important. Measures which should be taken to protect cultural resources once a route is approved, but prior to Board approval of the centerline, include: a schedule developed in consultation with SHPO which provides for establishment of survey methods and procedures to identify sites, to evaluate their significance and likely impact, to recommend measures to reduce potential impacts, and to implement identified measures; and a plan for impact assessment and mitigation as described in the Environmental Specifications (Appendix B).

APPENDIX A
DHES CORRESPONDENCE

DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES

TED SCHWINDEN, GOVERNOR
COGSWELL BUILDING
STATE OF MONTANA
HELENA, MONTANA 59620

September 10, 1984

Department of Natural Resources
and Conservation
Attn: Leo Berry, Director
32 S. Ewing
Helena, MT 59601

Dear Leo:

The Department of Health and Environmental Sciences (DHES) reviewed the Montana Power Company's (MPC) proposed construction, operation and maintenance of a 100-kV transmission line and associated substation facilities between Glengarry and Judith Gap, Montana.

The DHES would like to reiterate several comments that pertain specifically to this proposal:

Water Quality

The proposed project, as planned, does not require discharge permits or short-term authorizations to exceed Montana water quality standards. If unforeseen circumstances occur during construction that result in discharges or short-term violations of water quality standards, the necessary permits and authorizations must be obtained from the DHES before the discharges or violations occur.

Solid Waste

All solid wastes generated by the project must be disposed of at licensed Class II landfills according to the requirements of the Montana Solid Waste Management Act and ARM 16.14.501 et. seq. Additionally, any hazardous wastes generated must be disposed of in accordance with ARM 16.44.101 et. seq.

The review concluded that the project is in compliance with the substantive requirements of the statutes which are administered by the DHES in conjunction with the Montana Major Facility Siting Act.

Sincerely,

John J. Drynan, M.D.
Director

jg

AN EQUAL OPPORTUNITY EMPLOYER

APPENDIX B
PROPOSED CONSTRUCTION SPECIFICATIONS FOR THE JUDITH GAP TO GLENGARRY PROJECT

STATE OF MONTANA
STANDARD ENVIRONMENTAL SPECIFICATIONS FOR TRANSMISSION LINES 100 KV AND ABOVE
First Edition, July 1984

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- P. Names and addresses of STATE INSPECTOR and OWNER's liaison

DEFINITIONS

ACCESS EASEMENT:	Any land area over which the OWNER has received an easement from a landowner allowing travel to and from the project. Access easements may or may not include access roads.
ACCESS ROAD:	Any travel course which is constructed by substantial recontouring of land and which is intended to permit passage by most four-wheeled vehicles.
BEGINNING OF CONSTRUCTION:	Any project-related earthmoving or removal of vegetation (except for clearing of survey lines)
BOARD:	Montana BOARD of Natural Resources and Conservation
CONTRACTOR:	Constructors of the Facility (agent of owner)
OFWP:	Montana Department of Fish, Wildlife, and Parks
OHES:	Montana Department of Health and Environmental Sciences
ONRC:	Montana Department of Natural Resources and Conservation
DOH:	Montana Department of Highways
OSL:	Montana Department of State Lands
EXEMPT FACILITY:	A facility meeting the requirements of 75-20-202, MCA and accompanying rules
LANDOWNER:	The owner of private property or the managing agency for public lands
OWNER:	The owner(s) of the facility, or the owner's agent
SHPO:	State Historic Preservation Office

PREFACE

For any transmission facility approved by the Board of Natural Resources and Conservation, a set of environmental specifications must be developed jointly by the applicant and ONRC and included in the Certificate of Environmental Compatibility and Public Need.

For a specific project, draft language for those environmental specifications which apply to the entire project is developed prior to publication of the draft EIS. This language is then subjected to public review in the DEIS, revised for the final EIS, and approved by the Board at the time of route approval . Site-specific measures, which cannot be specified until after detailed centerline study, must be included in the Certificate at the time the Board approves a final centerline for the facility.

The purpose of this document is to provide a checklist and language for non-site-specific environmental specifications (items 0.0 through 4.5.2), and a checklist of types of site-specific data which typically need to be worked out during centerline study. This approach can greatly facilitate the preparation of a project-specific set of environmental specifications for Board approval. This document has been written to include language for most environmental specifications typically employed to mitigate impacts of transmission lines of voltages above 69 kV. These specifications are those which DNRC and BNRC have found necessary to ensure environmental protection during construction and operation of transmission facilities. The language included has been carefully worded to be suitable for most projects, but it is anticipated that certain minor modifications will be needed to accommodate a specific project of a certain voltage located in a certain portion of the state. Certain of the measures listed may not apply and may therefore be deleted; additional measures may be added as a result of public and agency involvement. It is intended that this document will be used as the starting point for discussions between an applicant and DNRC in preparing a final set of environmental specifications to be included in the OEIS on a specific project.

A number of site-specific attachments will ba worked out jointly by DNRC and the applicant during centarline study.

INTRODUCTION

The purpose of these specifications is to ensure mitigation of potential environmental impacts during the construction, operation, and maintenance of a transmission facility. These specifications are intended to be incorporated into the texts of contract plans and specifications.

For non-exempt facilities, the Montana Major Facility Siting Act supercedes all state environmental permit requirements except for those dealing with air and water quality, public health and safety, water appropriations and diversions, and easements across state lands (75-20-103 and 401, MCA). A major purpose of these specifications is to ensure that the intent of the laws which are superceded is met, even though the procedures of applying for and obtaining permits from various state agencies are not. As specified later in this document, the STATE INSPECTOR will have the responsibility for arranging reviews and inspections by other state agencies which would otherwise have been done through a permit application process.

Attachments A through P refer to the site-specific concerns and areas that apply for a specific project. These appendices, as needed, will be prepared by the OWNER working in consultation with the Department prior to Board approval of a centerline for a particular project.

0.0 GENERAL SPECIFICATIONS

0.1 SCOPE These specifications apply to all lands affected by the project. Where the landowner requests practises other than those listed in these specifications, the OWNER may authorize such a change provided that the STATE INSPECTOR is notified in writing of the change and that the change would not be in violation of: (1) the intent of any state law which is superceded by the Montana Major Facility Siting Act; (2) the Certificate; (3) any conditions imposed by the BOARD; or (4) the BOARD's finding of minimum adverse impact.

0.2 ENVIRONMENTAL PROTECTION The OWNER shall conduct all operations in a manner to protect the quality of the environment and to reduce impacts to the greatest extent practical.

0.3 CONTRACT DOCUMENTS These specifications shall be part of or incorporated into the contract documents; therefore, the OWNER and the OWNER'S agents shall be held responsible for adherence to these specifications in performing the work. If the OWNER'S agents fail to operate within the intent of these specifications, the BOARD or its authorized agent shall direct the OWNER to comply. Continued violation may result in a civil penalty of up to $10,000 per day pursuant to 75-20-408, MCA.

0.4 BRIEFING OF EMPLOYEES The OWNER shall ensure that the CONTRACTOR and all field supervisors are provided with a copy of these specifications and informed of which sections are applicable to specific procedures. The OWNER shall require that its construction supervisors are adequately trained and utilized in work appropriate to that training. Supervisors shall inform all employees on the applicable environmental constraints spelled out herein prior to and during construction. Site-specific measures spelled out in the appendices attached hereto shall be incorporated into the design and construction specifications or other appropriate contract document.

0.5 COMPLIANCE WITH REGULATIONS All project-related activities of the OWNER shall comply with all applicable local, state, and federal laws, regulations, and requirements. Compliance with the requirements of these environmental specifications will ensure that the intent of state laws which are superceded by MFSA is met.

0.6 DESIGNATION OF SENSITIVE AREAS The DNRC, in its evaluation of the project, designates certain areas along the right-of-way or access roads as SENSITIVE AREAS. Special precautions shall be taken in these areas during construction, operation, and maintenance, as described elsewhere in these specifications (see sections 1.1.2, 2.1.5, 2.1.6, 2.2.2, 2.9.3, 3.2.8, and 4.1.1). The OWNER shall take all reasonable actions to avoid adverse impacts in these SENSITIVE AREAS.

0.7 PERFORMANCE BONDS To ensure compliance with these specifications, the OWNER shall submit to the State of Montana or its authorized agent a RESTORATION BOND pertaining specifically to the restoration of the right-of-way and adjacent land damaged during construction. The entire RESTORATION BOND shall be held until post-construction monitoring by DNRC indicates that these specifications and other mitigating measures have been followed, that cleanup and restoration are complete, and that revegetation is progressing satisfactorily, at which time the OWNER shall be released from the RESTORATION BOND. At the time the OWNER is released, the OWNER shall submit to the State of Montana or its authorized agent a RECLAMATION BOND to be held for five years or until monitoring by DNRC indicates that reclamation and road closures have been adequate. Proof of bond shall be submitted to DNRC.

0.8 DESIGNATION OF STRUCTURES Each structure for the project shall be designated by a unique number on plan and profile maps. If this information is not available because the survey is not complete, locations along the centerline shall be indicated by station numbers or mileposts. Station numbers or mileposts of all angle points shall be designated on plan and profile maps.

0.9 ACCESS When easements for construction access are obtained for construction personnel, provision will be made by the OWNER to ensure that DNRC personnel will be allowed access to the right-of-way and to any off-right-of-way access roads used for construction during the term of the RESTORATION BOND.

0.10 DESIGNATION OF STATE INSPECTOR Prior to the beginning of construction, DNRC shall designate a STATE INSPECTOR or INSPECTORS to monitor the OWNER'S compliance with these specifications and any other project-specific mitigation measures adopted by the BOARD. The STATE INSPECTOR shall be the OWNER's liaison with the State of Montana on construction, post-construction, and reclamation activities. All communications regarding the project shall be directed to the STATE INSPECTOR. The name of the STATE INSPECTOR can be obtained by contacting the Administrator of the Energy Division, DNRC.

For this project, responsibilities of the STATE INSPECTOR include but are not limited to:

1) Review of plan and profile drawings submitted by the OWNER.

2) Granting of any waivers to the advance notification requirements contained in Section 1.0 of these specifications.

3) Field inspection of construction activity and those sites identified in the centerline evaluation as requiring specific construction techniques or precautions.

4) Determining compliance with these specifications.

5) Documentation of field observations and discussions with CONTRACTOR and/or OWNER's representative.

6) Preparation of periodic monitoring reports, and reports in support of bond release, retention, or forfeiture.

7) Authorizing release of RESTORATION or RECLAMATION BONDS.

8) Contacting other state agencies and arranging review or inspections by them as necessary.

0.11 SALVAGE Removal of existing structures replaced by the present line, or removal of the present line following its abandonment, shall be done in accordance with these specifications. Removal of any unused existing structures, if necessary, shall be done within twelve months after energization of the new line.

1.0 PRECONSTRUCTION PLANNING AND COORDINATION

1.1 PLANNING

1.1.1 Planning of all stages of construction and maintenance activities is essential to ensure that construction-related impacts will be kept to a minimum. The CONTRACTOR and OWNER will plan the timing of construction, construction and maintenance access and requirements, location of special use sites, and other details before the commencement of construction.

1.1.2. Before the start of construction of any segment of the line, the location of the centerline and of all construction access roads, maintenance access roads, structures, staging sites, pulling sites (if known), splicing sites (if known), borrow pits, campsites, and storage or other buildings shall be plotted on ortho photomosaics and/or plan and profile maps, at a scale of 1:24,000 or larger, or on available USGS 7.5' topographic maps (scale: 1:24,000), and submitted to the STATE INSPECTOR. All locations shall be submitted at least 14 days before the beginning of construction at the site. The STATE INSPECTOR shall be notified of any changes in these locations prior to construction (where designated SENSITIVE AREAS are affected, these changes must be submitted to the DNRC 7 days before construction and approved by the STATE INSPECTOR prior to construction.)

1.1.3. Long-term maintenance routes to all points on the line should be planned before construction begins. Where known, new construction access roads intended to be maintained for permanent use shall be differentiated from temporary access roads on the maps required under 1.1.2 above.

1.2 PRECONSTRUCTION CONFERENCE

1.2.1. At least one week before commencement of any construction activities, the OWNER shall schedule a preconstruction conference. The STATE INSPECTOR shall be notified of the date and location for this meeting. One of the purposes of this conference shall be to brief all involved persons regarding the content of these specifications and other Board-approved mitigating measures, and to make all parties aware of the roles of the STATE INSPECTOR and of the federal inspectors (if any).

1.2.2. The OWNER's representative, the CONTRACTOR's representative, the STATE INSPECTOR, and representatives of affected state and federal agencies shall be invited to attend the preconstruction conference.

1.3 PUBLIC CONTACT

1.3.1. The OWNER shall negotiate with the landowner in determining the best location for access easements, and the need for gates.

1.3.2. The OWNER shall contact local government officials, or the managing agency, as appropriate, regarding implementation of required traffic safety measures.

1.4. HISTORICAL AND ARCHAEOLOGICAL SURVEY.

1.4.1. The OWNER must develop and carry out a plan approved by the State Historic Preservation Office (SHPO) that includes steps which have been and will be taken to identify, evaluate, and avoid or mitigate damage to cultural resources affected by the project. The plan (Appendix I) shall include: (1) actions taken to identify cultural resources during initial intensive survey work; (2) an evaluation of the significance of the identified sites and likely impacts caused by the project; (3) recommended treatments or measures to avoid or mitigate damage to known cultural sites; (4) steps to be taken in the event other sites are identified after approval of the plan; and (5) provisions for monitoring construction to protect cultural resources. Except for monitoring, all steps of the plan must be carried out prior to the start of construction. The requirement for this plan should not be construed to exempt or alter compliance by the OWNER or managing agency with 36 CFR 800. This plan must be filed with SHPO.

2.0 CONSTRUCTION

2.1 GENERAL

2.1.1. The preservation of the natural landscape contours and environmental features shall be an important consideration in the location of all construction facilities, including roads, construction camps, storage areas, and buildings. Construction of these facilities shall be planned and conducted so as to minimize destruction, scarring, or defacing of the natural vegetation and landscape. Any necessary earthmoving shall be planned and designed to be as compatible as possible with the natural landforms.

2.1.2. Temporary construction sites and staging areas shall be kept to the minimum size necessary to perform the work. Such areas shall be located where most environmentally compatible, considering slope, fragile soils or vegetation, and risk of erosion. After construction, these areas shall be restored as specified in Section 3.0 of these specifications unless a specific exemption is authorized in writing by the STATE INSPECTOR.

2.1.3. All work areas shall be maintained in a neat, clean, and sanitary condition at all times. Trash or construction debris shall be regularly removed during the construction and reclamation periods.

2.1.4. In areas where mixing of soil horizons would lead to a significant reduction in soil productivity, increased difficulty in establishing permanent vegetation, or an increase in weeds, mixing of soil horizons shall be avoided insofar as possible. This may be done by removing and stockpiling topsoil, where practical, so that it may be spread over subsoil during site restoration. Known areas where stockpiling of topsoil is required will be determined, and others may be designated by the STATE INSPECTOR prior to construction and attached hereto.

2.1.5. SENSITIVE AREAS and all cultivated and planted areas and vegetation such as trees, plants, shrubs, and grass on or adjacent to the right-of-way which do not interfere with the performance of work, shall be preserved. The OWNER shall take all necessary actions to avoid adverse impacts to SENSITIVE AREAS. The STATE INSPECTOR shall be notified two working days in advance of initial clearing or construction activity in these areas.

2.1.6 The OWNER shall mark or flag the limits of disturbance in certain SENSITIVE AREAS. All construction activities must be conducted within this marked area.

2.1.7. The OWNER shall acquire appropriate land rights that cover as much as is practical of the land area that will be disturbed by construction. The width of the construction easement for this project shall be as specified in these specifications and attached.

2.1.8. Flow in a streamcourse may not be permanently diverted. If temporary diversion is necessary, flow will be restored before a major runoff season or the next spawning season, as determined by the STATE INSPECTOR in consultation with the managing agency (see 2.11.6).

2.2 CONSTRUCTION MONITORING

2.2.1. After the BOARD approves the OWNER's centerline location, the responsibility for follow-up actions lies with the STATE INSPECTOR. These actions consist of communication with the CONTRACTOR and OWNER's representative, documentation of field observations, and preparation of monitoring and bond release reports. The STATE INSPECTOR shall maintain discussions with the OWNER and the OWNER's agents in order to stay informed of construction activities in areas of concern to the state. The STATE INSPECTOR will observe construction at these areas when possible and necessary, and shall monitor OWNER compliance with the State Environmental Specifications and project specific mitigating measures.

2.2.2. The STATE INSPECTOR, the OWNER, and the OWNER'S agents will rely upon a cooperative working relationship to reconcile potential problems relating to construction in SENSITIVE AREAS. Enforcement action will occur when the OWNER or OWNER'S agent violates the substance of these specifications. When the STATE INSPECTOR determines that construction activities will cause excessive environmental impacts due to seasonal field conditions or encounters with sensitive features, he will talk with the OWNER about possible mitigating measures or minor construction rescheduling to avoid these impacts. The STATE INSPECTOR will be prepared to provide the OWNER with written documentation of the reasons for the modifications within 24 hours of their imposition. The STATE INSPECTOR will use the following administration tools:

2.2.3. The STATE INSPECTOR may, where necessary, issue COMPLIANCE ORDERS to the OWNER's representative. A COMPLIANCE ORDER is a directive used to advise the OWNER of the need to comply with specific elements of these specifications or other project mitigation measures. The COMPLIANCE ORDER may also be instructional in nature. All orders shall be in writing, but in emergencies may be issued orally provided written confirmation is made within 24 hours. In the event that the OWNER fails to comply with a valid COMPLIANCE ORDER and fails to provide acceptable evidence that he will comply, the STATE INSPECTOR shall file an incident report to the DNRC Director within two working days. Subsequent legal judgments against the OWNER may result in civil penalties up to $10,000 per day of continued violation, in accordance with 75-20-408, MCA.

2.2.4. The STATE INSPECTOR may require mitigation measures or procedures at some sites beyond those listed in Appendix A in order to minimize environmental damage due to unique circumstances that arise during construction, such as unanticipated discovery of a cultural site. The STATE INSPECTOR will issue written instructions to the OWNER for all such locations after consultation with the OWNER'S representative.

2.3 TIMING OF CONSTRUCTION

2.3.1. Construction and motorized travel will be restricted or prohibited at certain times of the year in certain areas. These areas, listed in Appendix D, may include but are not limited to the following areas:

a. The vicinity of heavily used recreation sites on weekends or holidays;

b. On or near winter ranges or other areas important to moose, elk, deer, antelope, mountain sheep, and mountain goats;

c. Sage and sharp-tailed grouse leks;

d. Raptor nesting sites or water bird colonies;

e. In or near streams during seasons of migratory fish spawning;

f. Areas with soils having low bearing strength when wet.

2.3.2. In order to prevent rutting and excessive damage to vegetation, construction will not take place during periods of high soil moisture when irreversible damage will occur.

2.4 PUBLIC SAFETY

2.4.1. All construction activities shall be done in compliance with existing health and safety laws.

2.4.2. Requirements for aeronautical hazard marking shall be determined by the OWNER in consultation with the Montana Aeronautical Division, the FAA, and DNRC. Where required, aeronautical hazard markings shall be installed at the time the wires are strung, according to the requirements listed in and attached to these specifications.

2.4.3. Noise levels shall not exceed established standards as a result of operation of the transmission line.

2.5 PROTECTION OF PROPERTY

2.5.1. Reasonable precautions shall be taken to protect, in place, all public land monuments and private property corners or boundary markers. If any such land markers or monuments are destroyed, the STATE INSPECTOR shall be notified immediately and the marker shall be reestablished and referenced in accordance with the procedures outlined in the "Manual of Instruction for the Survey of the Public Land of the United States" or, in the case of private property, the specifications of the county engineer. Reestablishment will be at the expense of the OWNER.

2.5.2. Construction shall be conducted so as to prevent any damage to existing real property including transmission lines, distribution lines, telephone lines, railroads, ditches, and public roads crossed. If such property is damaged by operations under this agreement, the OWNER shall repair such damage immediately to a satisfactory condition in consultation with the property owner.

2.5.3. In areas with livestock, care shall be taken to ensure that all gates are reclosed after entry or exit and the landowner shall be compensated for any losses to personal property due to construction or maintenance activities. Gates shall be inspected and repaired when necessary during construction and missing padlocks shall be replaced when requested by landowner. The OWNER shall ensure that gates are not left open at night or during periods of no construction activity. Any fencing or gates cut, removed, damaged, or destroyed by the OWNER shall immediately be replaced with new materials. Fences installed shall be of the same height and general type as the fence replaced or nearby fence on the same property, and shall be stretched tight with a fence stretcher before stapling or securing to the fence posts, subject to the desires of the landowner. Temporary gates shall be of sufficiently high quality to withstand repeated opening and closing during construction, to the satisfaction of the landowner.

2.5.4. The CONTRACTOR must notify the OWNER, the STATE INSPECTOR, and, if possible, the affected landowner within two working days damage to land, crops, property, or irrigation facilities, contamination or degradation of water, or livestock injury caused by the OWNER's construction activities, and the OWNER shall restore any damaged resource or property or provide compensation to the affected party.

2.5.5. Pole holes and anchor holes must be covered or fenced in any fields, pastures, or ranges used for livestock grazing or where the landowner requests it.

2.5.6. All fences crossed by permanent access roads shall be provided with a gate of a width satisfactory to the landowner. All fences to be crossed by access roads shall be braced before the fence is cut. Fences not to be gated should be restrung temporarily during construction and permanently within 30 days following construction, subject to the desires of the landowner.

2.5.7. Gates or other means of restricting livestock movement shall be placed where new access roads cross fencelines as requested by the landowner.

2.5.8. Any breaching of natural barriers to livestock movement by construction activities will require fencing sufficient to control livestock.

2.6 TRAFFIC CONTROL

2.6.1. At least 30 days before any construction within or over any state or federal highway right-of-way, the OWNER will notify the STATE INSPECTOR. The STATE INSPECTOR will arrange an on-site inspection with the OWNER and a representative of the DOH field office to review the proposed occupancy and to resolve any problems. The STATE INSPECTOR will prepare recommendations based on consultation with DOH. The OWNER must comply with any measures recommended by the STATE INSPECTOR following this inspection, including measures related to traffic control requirements.

2.6.2. In areas where the construction creates a hazard, traffic will be controlled according to the recommendations mentioned in Section 2.6.1. Safety signs advising motorists of construction equipment shall be placed on major state highways, as recommended by DOH. The installation of proper road signing will be the responsibility of the OWNER.

2.6.3. The managing agency shall be given adequate notice when it is necessary to close roads to public travel for short periods to provide safety during construction.

2.6.4. Construction vehicles and equipment will be operated at speeds safe for existing road and traffic conditions. Speed limits will be posted as approved by DOH or the managing agency.

2.6.5. Traffic delays will be restricted on primary access routes, as determined by the DOH or the managing agency.

2.6.6. Access for fire and emergency vehicles will be provided for at all times.

2.7 ACCESS ROADS AND VEHICLE MOVEMENT

2.7.1. Construction of new roads shall be held to the minimum reasonably required to construct and maintain the facility. State, county, and other existing roads shall be used for construction access wherever possible. Access roads intended to be permanent should be initially designed as such. The location of access roads and towers shall be established in consultation with affected landowners and landowner concerns shall be accommodated wherever reasonably possible.

2.7.2. All new roads, both temporary and permanent, shall be constructed with the minimum possible clearing and soil disturbance to minimize erosion, as specified in Section 2.11 of these specifications.

2.7.3. Where practical, all roads shall be initially designed to accommodate one-way travel of the largest piece of equipment that will eventually be required to use them; road width shall be no wider than necessary.

2.7.4. Roads shall be located in the right-of-way insofar as possible to enable traffic to avoid cables and conductors during conductor-stringing. Road crossings of the right-of-way should be near support structures.

2.7.5. Where practical, temporary roads shall be constructed on the most level land available. Where temporary roads cross flat land they shall not be graded or bladed unless necessary, but will be flagged or otherwise marked to show their location and to prevent travel off the roadway.

2.7.6. In order to minimize soil disturbance and erosion potential, no cutting and filling for access road construction shall be allowed in areas of 4 percent sideslope or less. In areas of over 4 percent sideslope, roadbuilding that may be required shall conform to a 4 percent outslope. The roads shall be constructed to prevent channeling of runoff, and shoulders or berms that would channel runoff shall be avoided.

2.7.7. The OWNER will maintain all permanent access roads, including drainage facilities, which are constructed for use during the period of construction.

2.7.8. Any use damage to existing private roads, including rutting, resulting from construction operation shall be repaired and restored to condition as good or better than original as soon as possible. Repair and restoration should be accomplished during and following construction as necessary to reduce erosion.

2.7.9. All permanent access road surfaces, including those under construction, will be prepared with the necessary erosion control practices as determined by the STATE INSPECTOR or the managing agency prior to the onset of winter.

2.7.10 Any necessary snow removal shall be done in a manner to preserve and protect roads signs, and culverts, to ensure safe and efficient transportation, and to prevent excessive erosion damage to roads, streams, and adjacent land.

2.7.11. At the conclusion of line construction, final maintenance will be performed on all existing private roads used for construction access by the CONTRACTOR. These roads will be returned to a condition as good or better than when construction began.

2.7.12. At least 60 days prior to construction of a new access road approach intersecting a state or federal highway, or of any structure encroaching upon a highway right-of-way, the OWNER shall submit to the STATE INSPECTOR a plan and profile map showing the location of the proposed construction. The STATE INSPECTOR shall arrange for inspection of the site by the Department of Highways. The OWNER shall comply with any modifications recommended by the STATE INSPECTOR following this inspection.

2.8. EQUIPMENT OPERATION

2.8.1. During construction, unauthorized cross-country travel and the development of roads other than those approved shall be prohibited. The OWNER shall be liable for any damage, destruction, or disruption of private property and land caused by his construction personnel and equipment as a result of unauthorized cross-country travel and/or road development.

2.8.2. To prevent excessive soil damage in areas wehre a graded roadway has not been constructed, the limits and locations of access for construction equipment and vehicles shall be clearly marked or specified at each new site before any equipment is moved to the site. Construction foremen and personnel should be well versed in recognizing these markers and shall understand the restriction on equipment movement that is involved.

2.8.3. Dust control measures shall be implemented on access roads where required by the managing agency or where dust would pose a nuisance to residents. Construction activities and travel shall be conducted to minimize dust. Water, straw, wood chips, dust palliative, gravel, combinations of these, or similar control measures may be used. Oil or similar petroleum-derivatives shall not be used.

2.8.4. Work crew foremen shall be qualified and experienced in the type of work being accomplished by the crew they are supervising. Earthmoving equipment shall be operated only by qualified, experienced personnel.

2.8.5. Motorized overland vehicles shall be used to string socklines only where terrain warrants, or where it can be done from existing access roads. Areas where motorized vehicles can be used shall be jointly determined by the OWNER, the STATE INSPECTOR, and the landowner.

2.8.6. Following construction in areas designated by the local weed control board as noxious weed area , the CONTRACTOR shall thoroughly clean all vehicles and equipment to remove weed parts and seeds immediately prior to leaving the area.

2.9 RIGHT-OF-WAY CLEARING AND SITE PREPARATION

2.9.1. The STATE INSPECTOR shall be notified at least ten days prior to any timber clearing. The STATE INSPECTOR shall be responsible for notifying the DSL Forestry Division.

2.9.2. During clearing of survey lines or the right-of-way, shrubs shall be preserved to the greatest extent possible. Shrub removal shall be limited to crushing where possible or cutting where necessary. Plants may be cut off at ground level, leaving roots undisturbed so that they may resprout.

2.9.3. Small trees and shrubs that do not interfere with the powerline and would not grow to create a problem over a ten-year period should be allowed to grow on the right-of-way and beneath the conductors. Young growth or trees left standing shall be protected.

2.9.4. Soil disturbance and earth moving will be kept to a minimum.

2.9.5. Crane landings shall not be constructed on level ground unless extreme conditions (such as soft or marshy ground) make such construction necessary. Construction of more than one crane landing per tower site will require prior approval of the STATE INSPECTOR.

2.9.6. To avoid unnecessary ground disturbance, counterpoise should be placed or buried in disturbed areas whenever possible.

2.10 GROUNDING

Grounding of fences, buildings, and other structures on and adjacent to the right-of-way shall be done according to the specifications of the National Electric Safety Code and any other specifications listed and attached to these specifications.

2.11 EROSION AND SEDIMENT CONTROL

2.11.1. Clearing and grubbing for roads and rights-of-way and excavations for stream crossings shall be carefully controlled to minimize silt or other water pollution downstream from the rights-of-way. Sediment retention basins will be installed as required by the STATE INSPECTOR or the landowner.

2.11.2. Roads shall cross drainage bottoms at sharp or nearly right angles and level with the streambed whenever possible. Use of temporary bridges, fords, culverts, or other structures to avoid stream bank damage required at stream crossings will be listed and attached.

2.11.3. Under no circumstances shall streambed materials be removed for use as backfill, embankments, road surfacing, or for other construction purposes.

2.11.4. No excavations shall be allowed on any river or perennial stream channels or floodways at locations likely to cause detrimental erosion or offer a new channel to the river or stream at times of flooding.

2.11.5. Installation of culverts, bridges, or other structures in perennial streams will be done with normal construction procedures following on-site inspections with DNRC and DFWP and approval by the STATE INSPECTOR. All culverts shall be installed with the culvert inlet and outlet at natural stream grade or ground. Water velocities or positioning of culverts shall not be such that fish passage is impaired.

2.11.6. At least 60 days prior to the construction of access roads, bridges, fill slopes, culverts, or impoundments, or channel changes within the high-water mark of any perennial stream lake, or pond, the OWNER shall submit to the STATE INSPECTOR the following: location of the activity and property boundaries on plan and profile maps or photo mosaics; dates of proposed construction; names and addresses of surrounding property owners; and culvert size and description of proposed construction activity including culvert and bridge size (where applicable) and method of size determination. Within 30 days of the submission of this material, the STATE INSPECTOR will arrange a site inspection, if necessary, with the OWNER and representatives of MDFWP and the Local Conservation District. The OWNER will comply with any construction stipulations or procedures recommended by the STATE INSPECTOR following this field inspection. If the STATE INSPECTOR determines that construction activity will result in a significant increase in turbidity, then the STATE INSPECTOR shall contact the OWNER and DHES to discuss options for compliance with Montana Water Quality Standards.

2.11.7. No blasting shall be allowed in streams. Blasting may be allowed near streams if precautions are taken to protect the stream from debris and from entry of nitrates or other contaminants into the stream.

2.11.8. The OWNER shall maintain private roads while using them. All ruts made by machinery shall be filled or graded to prevent channeling. In addition, the OWNER must take measures to prevent the occurrence of erosion caused by wind or water during and after use of these roads. Some erosion-preventive measures include but are not limited to installing or using cross logs, drain ditches, water bars, and wind erosion inhibitors such as water, straw, gravel, or combinations of these.

2.11.9. The OWNER shall prevent material from being deposited in any watercourse or stream channel. Where necessary, measures such as hauling of fill material, construction of temporary barriers, or other approved methods shall be used to keep excavated materials and other extraneous materials out of watercourses. Any such materials entering watercourses shall be removed immediately.

2.11.10. The OWNER shall be responsible for the stability of all embankments created during construction. Embankments and backfills shall contain no stream sediments, frozen material, large roots, sod, or other materials which may reduce their stability.

2.11.11. Culverts, arch bridges, or other stream crossing structures shall be installed at all permanent crossings of flowing or dry watercourses where fill is likely to wash out during the life of the road. Culvert or bridge installation is prohibited in areas of important fish spawning beds identified by MDFWP and during specified fish spawning seasons on less sensitive streams or rivers. All culverts shall be big enough to handle approximately 15-year floods. Culvert size shall be determined by standard procedures which take into account the variations in vegetation and climatic zones in Montana, the amount of fill, and the drainage area above the crossing, and shall be approved as specified in 2.11.6. All culverts shall be installed at the time of road construction.

2.11.12. No fill material other than that necessary for road construction shall be piled within the high water zone of streams where floods can transport it directly into the stream. Excess floatable debris shall be removed from areas immediately above crossings to prevent obstruction of culverts or bridges during periods of high water.

2.11.13. No driving of vehicles across a perennial watercourse shall be allowed, except via authorized construction roads.

2.11.14. No perennial watercourses shall be permanently blocked or diverted.

2.11.15. Construction methods shall prevent accidental spillage of solid matter, contaminants, debris, petroleum products, and other objectionable pollutants and wastes into watercourses, lakes, and underground water sources. Catchment basins capable of containing the maximum accidental spill shall be installed at areas where fuel, chemicals or oil are stored. Any accidental spills of such materials shall be cleaned up immediately.

2.11.16. Construction equipment service areas shall be as approved by the landowner but shall not be located within a 100-year floodplain as designated by the Engineering Bureau, Water Resources Division, DNRC.

2.11.17. To reduce the amount of sediment entering streams, a strip of undisturbed vegetation will be provided between areas of disturbance (road construction or tower construction) and streamcourses, and around first order or larger streams that have a well-defined streamcourse or aquatic or riparian vegetation, unless otherwise required by the landowner. Buffer strip width is measured from the high water line of a channel and will be as determined by the STATE INSPECTOR and managing agency, using Table 1 as a guideline. For braided streams with more than one discernible channel (ephemeral or permanent) the high water line of the outermost channel is used. In the event that vegetation cannot be left undisturbed, structural sediment containment, approved by the STATE INSPECTOR, must be substituted before soil disturbing activity commences.

Table 1

Recommended Buffer-Filter Strip Widths From High Water Line of Stream

Land Slope	For Stable Soils Non-Fishery Streams (Feet)	For Fishery Stream or Sensitive Soils* With Dissected Slopes (Feet)
0 %	25	50
10 %	45	90
20 %	65	130
30 %	85	170
40 %	105	210
50 %	125	250
60 %	145	290
70 %	165	330

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*Designated in Appendix A.

2.11.18. When no longer needed, all temporary structures or fill installed to aid stream crossing shall be removed and the course of the stream reestablished to prevent future erosion.

2.11.19. All temporary dams built on the right-of-way shall be removed after line construction unless otherwise approved by the STATE INSPECTOR. Dams allowed to remain shall be upgraded to permanent structures and shall be provided with spillways or culverts and with a continuous sod cover on their tops and downstream slopes. Spillways may be protected against erosion with riprap or equivalent means.

2.11.20. Damage resulting from erosion or other causes shall be repaired after completion of grading and before revegetation is begun.

2.11.21. Point discharge of water will be dispersed in a manner to avoid erosion or sedimentation of streams.

2.11.22. Riprap or other erosion control activities will be planned based on possible downstream consequences of activity, and placed during the low flow season if possible.

2.11.23. Water used in embankment material processing, aggregate processing, concrete curing, foundation and concrete lift cleanup, and other waste water processes shall not be discharged into surface waters without a valid discharge permit from DHES.

2.12 ARCHAEOLOGY AND HISTORY

2.12.1. All construction activities shall be conducted so as to prevent damage to areas known to be or likely to be of archaeological, historical, or paleontological significance, in accordance with the requirements of 1.4.1.

2.12.2. Any relics, artifacts, fossils or other items of historical, paleontological, or archaeological value shall be preserved in a manner agreeable to both the landowner and the State Historic Preservation Officer. If any such items are discovered during construction, SHPO shall be notified and all work which could disturb the materials or surrounding area must cease until the site can be properly evaluated by a qualified archaeologist and recommendations made based on the Historic Preservation Plan outlined in Section 1.4.1 (but in no case more than 10 days). Recommendations of the State Historic Preservation Officer must be followed by the OWNER.

2.12.3. The OWNER shall conform to treatments recommended for cultural resources by either the Montana State Historic Preservation Office (SHPO) or the Advisory Council on Historic Preservation (ACHP) and which are to be attached.

2.13 PREVENTION AND CONTROL OF FIRES

2.13.1. Burning, fire prevention, and fire control shall comply with the burning plan and fire plan. These plans shall meet the requirements of the managing agency and/or the fire control agencies having jurisdiction. The STATE INSPECTOR shall be invited to attend all meetings with these agencies to discuss or prepare these plans. The STATE INSPECTOR, in turn, shall notify DSL of all such meetings.

2.13.2. The OWNER shall direct the CONTRACTOR to comply with regulations of any county, town, state or governing municipality having jurisdiction regarding fire laws and regulations.

2.13.3. Blasting caps and powder shall be stored only in approved areas and containers and always separate from each other.

2.13.4. The OWNER shall direct the CONTRACTOR to properly store and handle combustible material which could create objectionable smoke, odors, or fumes. The OWNER shall direct the CONTRACTOR not to burn refuse such as trash, rags, tires, plastics, or other debris, except as permitted by the county, town, state, or governing municipality having jurisdiction.

2.14 WASTE DISPOSAL

2.14.1. The OWNER shall direct the CONTRACTOR to use licensed solid waste disposal sites. Inert materials (Group III wastes) may be disposed of at Class III landfill sites; mixed refuse (Group II wastes) must be disposed of at Class II landfill sites.

2.14.2. Emptied pesticide containers or other chemical containers must be triple rinsed to render them acceptable for disposal in Class II landfills or for scrap recycling pursuant to ARM 16.44.202(12) for treatment or disposal. Pesticide residue and pesticide containers shall be disposed of in accordance with ARM 16.20.633(9).

2.14.3. All waste materials constituting a hazardous waste defined in ARM 16.44.303, and wastes containing any concentration of polychlorinated biphenyls must be transported to an approved designated hazardous waste management facility (as defined in ARM 16.44.202(12) for treatment or disposal.

2.14.4. All used oil shall be hauled away and recycled or disposed of in a licensed Class II landfill authorized to accept liquid wastes or in accordance with 2.14.2 and 2.14.3 above. There shall be no intentional release of crankcase oil or other toxic substances into streams or soil. In the event of an accidental spill into a waterway, the substances will be cleaned up and the Water Quality Bureau, DHES, will be contacted immediately.

2.14.5. Sewage shall not be discharged into streams or streambeds. The OWNER shall direct the CONTRACTOR to provide refuse containers and sanitary chemical toilets, convenient to all principal points of operation. These facilities shall comply with applicable federal, state, and local health laws and regulations.

2.14.6. Refuse burning shall require the prior approval of the landowner and a Montana Open Burning Permit must be obtained from MDHES. Any burning of wastes shall comply with section 2.13 of these specifications.

3.0 POST-CONSTRUCTION CLEANUP AND RECLAMATION

3.1 CLEANUP

3.1.1. All litter resulting from construction is to be removed, to the satisfaction of the landowner, from the right-of-way and along access roads leading to the right-of-way. Such litter shall be legally disposed of as soon as possible, but in no case latter than within 60 days of completion of wire clipping. If requested by the landowner, the OWNER shall provide for removal of any additional construction-related debris discovered after this initial cleanup.

3.1.2. Insofar as practical, all signs of temporary construction facilities such as haul roads, work areas, buildings, foundations or temporary structures, stockpiles or excess or waste materials, or any other vestiges of construction shall be removed and the areas restored to as natural a condition as is practical, in consultation with the landowner.

3.2 RESTORATION, RECLAMATION, AND REVEGETATION

3.2.1. Restoration, reclamation, and revegetation of the right-of-way, access roads, crane pads, splicing or stringing sites, borrow sites, gravel, fill, stone, or aggregate excavation, or any other disturbance shall be in accordance with the Reclamation and Revegetation Plan. The STATE INSPECTOR, the managing agency, and the contracting officer shall be invited to attend all meetings to discuss or prepare this plan. Failure of the OWNER to comply with this plan shall be cause for forfeiture of the RESTORATION or RECLAMATION BONDS.

3.2.2. Scarring or damage to any landscape feature listed in these specifications shall be restored as nearly as practical to its original condition. Bare areas created by construction activities will be reseeded in compliance with Appendices K and L to prevent soil erosion.

3.2.3. After construction is complete, and in cooperation with the landowner, temporary roads shall be closed.

3.2.4. In agricultural areas where soil has been compacted by movement of construction equipment, the OWNER shall direct the CONTRACTOR to rip the soil deep enough to restore productivity, or if complete restoration is not possible, the OWNER shall compensate the landowner for lost productivity.

3.2.5. Earth next to access roads that cross streams shall be replaced at slopes less than the normal angle of repose for the soil type involved.

3.2.6. All drainage channels shall be restored to a gradient and width which will prevent accelerated gully erosion.

3.2.7. Drive-through dips, open-top box culverts, waterbars, or cross drains shall be added to roads at the proper spacing and angle as necessary to prevent erosion.

3.2.8. Sidecasting of waste materials may be allowed on slopes over 40 percent after approval by the landowner; however, this will not be allowed within the buffer strip established for stream courses, in areas of high or extreme soil instability, or in other SENSITIVE AREAS. Surplus materials shall be hauled to landowner-approved sites in such areas.

3.2.9. Interrupted drainage systems shall be restored.

3.2.10. Seeding prescriptions to be used in revegetation, requirements for hydroseeding, fertilizing, and mulching, as jointly determined by representatives of the OWNER, DNRC, DSL, and other involved state and federal agencies, are specified in Appendix L.

3.2.11. During restoration in areas where topsoil has been stockpiled, the site will be graded to near natural contours and the topsoil will be replaced on the surface.

3.2.12. Excavated material not suitable or required for backfill shall be evenly filled back onto the cleared area prior to spreading any stockpiled soil. Large rocks and boulders uncovered during excavation and not buried in the backfill will be disposed of as approved by the STATE INSPECTOR and/or the landowner.

3.2.13. Application rates and timing of seeds and fertilizer, and purity and germination rates of seed mixtures, shall be determined jointly. Reseeding shall be done at the first appropriate opportunity after construction ends for each segment of the line, or as determined by the landowner.

3.2.14. Where appropriate, hydroseeding, drilling, or other appropriate methods shall be used to aid revegetation. Mulching with straw, wood chips, or other means shall be used where necessary.

3.2.15. All temporary roads shall be obliterated and reclaimed (with the concurrence of the landowner). All temporary roadways shall be graded and scarified as specified to permit the growth of vegetation and to discourage traffic. Permanent unsurfaced roadbeds not open to public use will be revegetated as soon after use as possible unless specified otherwise by the landowner.

3.3 MONITORING

3.3.1. Upon notice by the OWNER, the STATE INSPECTOR will immediately schedule initial post-construction field inspections following clean up and road closure. Follow-up visits will be scheduled as required to monitor the effectiveness of erosion controls, reseeding measures, and the right-of-way management plan.

The STATE INSPECTOR will contact the landowner for post-construction access and to determine landowner satisfaction with the OWNER'S restoration measures. Revegetation objectives shall be consistent with Section 2.1.23 of these Guidelines.

The STATE INSPECTOR shall document observations for inclusion in reports to the BOARD regarding bond release or the success of mitigation measures required by the BOARD.

3.3.2. Success of revegetation shall be based on criteria specified in the reclamation and revegetation plan.

3.3.3. Failure of the OWNER to adequately reclaim all disturbed areas in accordance with section 3.2. of these specifications shall be cause for forfeiture of the RECLAMATION BOND.

4.0 OPERATION AND MAINTENANCE

4.1 RIGHT-OF-WAY MANAGEMENT AND ROAD MAINTENANCE

4.1.1. Maintenance of the right-of-way and permanent access roads shall be as specified in the right-of-way management plan. This plan shall provide for the protection of SENSITIVE AREAS identified prior to and during construction.

4.1.2. Vegetation that has been saved through the construction process and which does not pose a hazard or potential hazard to the powerline, particularly that of value to fish and wildlife shall be allowed to grow on the right-of-way.

4.1.3. In areas other than cropland, vegetative cover shall be maintained in the areas immediately adjacent to transmission towers in cooperation with the landowner.

4.1.4. Grass cover, water bars, cross drains, and the proper slope shall be maintained on permanent access roads and service roads in order to prevent soil erosion.

4.2 MAINTENANCE INSPECTIONS

4.2.1. Inspection and ground maintenance activities of the powerline shall include observations of soil erosion problems, and conditions of the vegetation on the right-of-way or access roads that require attention. Appropriate corrective action will be taken where necessary.

4.2.2. Operation and maintenance inspections using ground vehicles shall be timed so that routine maintenance will be done when access roads are firm, dry or frozen, wherever possible.

4.3 CORRECTION OF LANDOWNER PROBLEMS

4.3.1. When radio or TV interference is documented to occur as a result of the construction or operation of the transmission line, the OWNER will resolve the problems in a manner satisfactory to the landowners.

4.4 HERBICIDES AND WEED CONTROL

4.4.1. Weed control, including any application of herbicides in the right-of-way, will be in accordance with recommendations of the Montana Department of Agriculture, and in accordance with the right-of-way maintenance plan.

4.4.2. Herbicides will not be used in certain areas identified by DNRC, MDFWP, and DHES or as requested by the landowner.

4.4.3. Proper herbicide application methods will be used to keep drift and nontarget damage to a minimum.

4.4.4. Herbicides must be applied according to label specifications and in accordance with 4.4.1. above. Only herbicides registered in compliance with applicable federal and state laws may be applied.

4.4.5. Herbicides shall not be sprayed during heavy rains or threat of heavy rains. Vegetative buffer zones shall be left along all identifiable stream channels.

4.4.6. In areas disturbed by transmission facilities, the OWNER will cooperate with landowners in control of noxious weeds as designated by the weed control board having jurisdiction in the county crossed by the line.

4.4.7. The OWNER shall notify the STATE INSPECTOR in writing 30 days prior to any broadcast or aerial spraying of herbicides. The notice shall provide details as to the time, place, and justification for such spraying. DNRC, DFWP, DHES, and the Montana Department of Agriculture shall have the opportunity to inspect the portion of the ROW or access roads scheduled for such treatment before, during, and after spraying.

4.4.8. All applications of herbicides must be performed by a licensed applicator.

4.4.9 During the second and third growing seasons following the completion of restoration and reseeding, the OWNER and STATE INSPECTOR shall inspect the right-of-way and access roads for newly-established stands of noxious weeds. The county weed control supervisor shall be invited to attend this inspection. In the event that stands of weeds are encountered, appropriate control measures shall be taken by the OWNER.

4.5. MONITORING

4.5.1. DNRC may continue to monitor operation and maintenance activities for the life of the project in order to ensure compliance with the specifications in this section.

4.5.2. The OWNER will be responsible to DNRC for the term of the RECLAMATION BOND (section 0.7). After this time the OWNER will report to individual agencies except as specified in conditions to the certificate.

**: Attachments to these specifications are being developed by DNRC and MPC. A final version of these specifications and attachments will be submitted with the final centerline report to the Board.

LITERATURE CITED

Byrnes, W. R., W. W. McFee, and G.C. Steinhardt. 1981.
Soil Compaction Related to Agricultural and Construction Operations. State-of-the-Art Review and Bibliography with Interpretations for Transmisson Rights-of-Way prepared for New York State Electric and Gas Corp. Forestry Section. R&D Project 150.50.38 prepared by Asplundh Environmental Services. Willow Grove, PA.

Chancellor, William J. 1977.
Compaction of Soil by Agricultural Equipment. University of California, Division of Agricultural Sciences. Bulletin 1881. Berkeley, CA.

Environmental Quality Council 1972.
First annual report. Helena, MT.

March, Daniel N. 1983.
Lewistown alternate route communication analysis. Prepared for the Montana Power Company by March Engineering, Inc. Bozeman, MT.

Montana Bureau of Mines and Geology. 1984.
Telephone conversation between Mike Stickney of the Bureau of Mines and Geology and Earl Griffith, Physical Sciences Coordinator, on August 23, 1984.

Montana Department of Labor and Industry.
Montana employment and labor force, 1st and 2nd quarters, 1984.

Montana Power Company. 1983.
An application for a permit to site a major facility: A 100-kV transmission line from Glengarry to Judith Gap and associated substation facilities, Central Montana. 2 volumes. Butte, MT.

Montana Power Company. 1983a.
Montana Power Company Systems Map, July 1983. Butte, MT.

Ontario Hydro, 1978.
A Preliminary Study of Changes to Natural and Agricultural Lands Affected by Transmission Line Construction. Ontario Hydro Environmental Resources Section, Transmission Environment Department.

Poore, M. 1984.
Fish and wildlife biologist, Montana Department of Fish, Wildlife, and Parks, Lewistown, MT. Telephone conversation with Larry Thompson, Biol. Sci. Coordinator, DNRC, Sept. 13.

Watts, C. R. 1984.
Fish and wildlife biologist, Montana Department of Fish, Wildlife, and Parks, Lewistown, MT. Telephone conversation with Larry Thompson, Biol. Sci. Coordinator, DNRC, May.

Western Area Power Administration. 1982.
Draft environmental impact statement, Fort Peck-Havre transmission line project. U.S. Department of Energy. Washington, D.C.

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